# Studio 5

OPCODE
SYSTEMS INC

# Studio 5

Manual written by Gregory A. Simpson

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Opcode Systems, Inc.
3641 Haven Drive, Suite A
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If you still have a problem, call Opcode Systems, Inc. Technical Support Line at (415) 369-1676. See the Studio 5 manual for details.

## WARNING

*NOTE: This equipment has been type tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.*

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Move the equipment away from the receiver
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

***CAUTION:** Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and must have shielded interface cables.*

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the users authority to operate such equipment.

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# 1 Getting Started

## WHAT IS THE STUDIO 5?

Opcode's Studio 5 is a Macintosh MIDI interface with a built-in MIDI patchbay, MIDI processor and SMPTE-to-MIDI converter. The Studio 5 has 15 MIDI In ports and 15 MIDI Out ports with 128 internal patch locations for storing MIDI routing and processing configurations. With OMS-compatible software, the Studio 5's 15 MIDI ports can be addressed separately for 240 distinct MIDI channels. Software that works with the MIDI Time Piece™ can also address the Studio 5's 15 outputs separately. The Studio 5 can split, transpose, modify and map MIDI data in many useful ways.

The Studio 5 converts SMPTE timecode into industry standard MIDI Time Code (MTC) for use within Macintosh applications. It will read and write SMPTE code in all formats. The Studio 5 will rewrite fresh SMPTE when locked to an incoming signal ("JamSync"), and it will "flywheel", remaining locked despite dropouts or other short SMPTE errors. It allows an audio trigger to be used as a sync source when working with Opcode's Vision sequencing program and is also compatible with Direct Time Lock (DTL) and Enhanced Direct Time Lock (DTLe) for synchronizing with other software applications.

The Studio 5 requires the Opcode MIDI System (OMS) for configuring its various modes of operation. The Studio 5/OMS software is included with the Studio 5.

## WHAT ARE SMPTE AND MIDI TIME CODES?

SMPTE timecode is an international standard created by the Society of Motion Picture & Television Engineers. It specifies a format and modulation method for recording digital code onto a longitudinal track of video and/or audio magnetic tape. It's used as a timing control for the interaction of music, video, and other pieces of equipment.

Five SMPTE frame rates can be generated and read by the Studio 5. These rates are as follows:

- 24 Frames/second—Film frame rate.
- 25 Frames/second—EBU (European) television frame rate.
- 29.97 Drop Frame—NTSC (North American) color television frame rate. This format runs at 30 Frames/second, but has the first two frames dropped every minute, except at minutes 0, 10, 20, 30, 40, and 50.
- 29.97 Frames/second (Non-Drop)—Used to sync to NTSC color television without dropping frames. SMPTE time does not match real-time, but playback pitch is unaffected.

- 30 Frames/second (Non-Drop)—Original NTSC black and white television standard. Often used in audio-only situations since there are no dropped frames and the SMPTE time is equal to real time.

For more information, refer to the 1981 proposed American national standard for television-time and control code-video and audio tape- 525-line/60-field systems. ANSI V98.12M-1981

MIDI Time Code (MTC) is a standard that allows the timing information of SMPTE timecode (i.e., hours, minutes, seconds, and frames) to be sent along with or instead of other MIDI data over a convenient MIDI cable, and is useful for synchronizing your computer sequence to tape.

The Studio 5 recognizes Longitudinal Time Code (LTC). LTC resides on the audio track of a video tape. Audio tracks run with the length of the tape (longitudinally) as opposed to being embedded within the helical scan of the video heads. Vertical Interval Time Code (VITC) is encoded helically with the video information. To use this type of timecode with the Studio 5, you must use a VITC to LTC converter.

## HOW TO READ THIS MANUAL

This manual assumes that you are familiar with basic Macintosh operations. If you're not, please read the Macintosh manual. In particular, you should be familiar with clicking, double-clicking, dragging, choosing, selecting, scrolling, windows and pop-up menus.

This manual discusses how to connect, set up and use the Studio 5. The Studio 5's MIDI processing and routing patches are programmed on the Macintosh using the Opcode MIDI System (OMS). If you're already familiar with OMS, you can read this manual straight through.

If you have never used OMS, first read Chapters 2 and 3 in this manual. These chapters will guide you through the Studio 5's front and rear panels and will help you to integrate the unit into your studio. You should then read the OMS manual (included with the Studio 5) to become familiar with OMS. Pay particular attention to the sections on installing OMS, defining devices in your studio, and creating a current OMS Studio Setup document.

Chapter 4, "OMS Patches", explains how to design OMS patches for the routing, filtering, and modifying of MIDI data.

Chapter 5, "Using the Studio 5 with Non-OMS MIDI Software", discusses using the Studio 5 with non-OMS MIDI software. It also covers emulating a standard MIDI interface and a MIDI Time Piece.

Chapter 6 covers all menu items including SMPTE applications and setting Fast Mode communication speeds.

If you have never worked with Opcode programs before, you should read "Appendix A: Working with Opcode Applications". This describes some of the editing techniques used by this and other Opcode programs. Appendix B contains short, basic tutorials on working with SMPTE. Appendix C discusses using the Studio 5's Audio Input with Vision, Appendix D covers basic troubleshooting techniques, and Appendix E lists the Studio 5's specifications.

## THE STUDIO 5 PACKAGE

Your Studio 5 package contains the Studio 5, two 12' serial cables, one power cable, a mounting kit (consisting of 2 rack ears, 6 screws, and 4 rubber feet), OMS/Studio 5 software, an OMS manual, a Studio 5 manual, and your registration card.

## STUDIO 5 SYSTEM REQUIREMENTS

To use the Studio 5, you'll need:

- a Macintosh Plus or better with at least one Megabyte of RAM (2 Meg recommended) and System 6.0.3 or higher.
- One or more MIDI devices.
- One or more MIDI cables to connect you MIDI device(s) to the Studio 5.
- Hard disk recommended.

## REGISTERING YOUR STUDIO 5

Be sure to send Opcode your Registration Card. If we don't receive it, you won't be eligible for free technical support and various other services and products.

***IMPORTANT:*** *Please write down your Studio 5 serial number here. The serial number can be found on the back of the Studio 5 by the power connector.*

S/N 0129

Purchase Date _____

When we receive your Registration card, you'll be entitled to free technical support and information about upgrades, updates, and new products. Also, you'll receive Opcode's periodic newsletter, which contains advanced tips, troubleshooting techniques, and more.

Opcode technical support hours (Pacific Time) are:

- Monday through Thursday: 9:30 a.m. to 9:00 p.m.
- Friday: 9:30 a.m. to 5:00 p.m.
- Saturday: 12 noon to 9:00 p.m.

Call (415) 369-1676 for technical support, but *please* try to find the answer in this manual first.

***NOTE:*** *Technical support hours are subject to change.*

# 2 Panel Descriptions

## THE STUDIO 5 FRONT PANEL

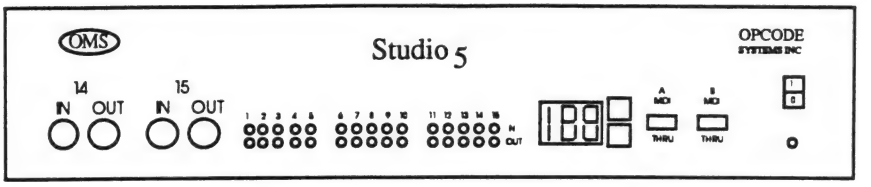



**Diagram of the Front Panel of the Studio 5.**

From left to right the switches, LEDs and jacks are as follows:

### MIDI Ports 14 and 15

There are 13 sets of MIDI connectors on the back of the Studio 5. Pairs 14 and 15 are on the front of the unit to facilitate quick, temporary connection of a synthesizer, controller, or other MIDI device.

### MIDI Activity LEDs

These Light Emitting Diodes (LEDs) indicate MIDI activity either coming in or going out of the Studio 5. The top row of red LEDs show when MIDI data is being received in any of the 15 MIDI In ports. The bottom row of green LEDs illustrate when MIDI data is being sent out any of the 15 MIDI Out ports.

### Patch Number Display

This 3 digit display shows the current patch number used by the Studio 5. It will also display error messages should the Studio 5 experience difficulty (see Appendix D). A zero (0) will be displayed the first time the unit is turned on. This indicates that no patches are defined.

### Increment/Decrement Buttons

The increment/decrement buttons have three uses:

1. Primarily, they allow you to step through the Studio 5's internal patches as defined by the current Patch document. Patch documents are discussed in Chapter 4. The Studio 5 is "smart" because it knows exactly how many patches you have defined. Say, for example, that you have defined 3 patches numbered 1, 15, and 78. When you push the top (increment) button, you'll step from patch 1 to patch 15. Press it again, and you'll go to patch 78. The Studio 5 stores only as many patches as you have defined, expediting front-panel patch access. Hold down either button to increment or decrement continuously.
2. You can use the buttons to reset the Studio 5, deleting all patches and processing information. To do this, hold in both buttons while turning on the Studio 5. You may wish to reset the Studio 5 if you fail to reestablish communication between the Macintosh and the Studio 5 by choosing **Re-establish Communication** from the **Studio 5** menu, or by turning the Studio 5 off and then on again.
3. When the Studio 5 is on, pushing the increment and decrement buttons simultaneously will act as a "panic button", silencing any MIDI devices that are connected to the Studio 5.

*NOTE: The Studio 5 does not send the MIDI All Notes Off command since it is not implemented by all MIDI devices. Instead, it sends a MIDI Note Off command for all 128 notes, as well as a sustain pedal up MIDI controller message, on all 16 MIDI channels, to all 15 MIDI output ports.*

### Thru Switches (A & B)

These switches allow for convenient access to printers, modems, or other peripherals. When a Thru switch is "IN" (MIDI position), the Studio 5 is in MIDI mode—transmitting MIDI data to and from your Macintosh and various studio devices. When a Thru switch is "OUT" (THRU position), data from the Macintosh (as received on either the "A" or "B" input port) is sent to the "A Thru" or "B Thru" port on the rear panel. Set a Thru switch to the "OUT" position when your Macintosh needs to communicate with an external peripheral.

*NOTE: MIDI Thru (routing of MIDI INs to MIDI OUTs) is not affected by these switches since the Studio 5's internal patches can be used to implement MIDI thruing.*

### SMPTE/Power Indicator Light

This LED will blink when there is any SMPTE activity or when triggered by a signal at the Audio In jack. When no timecode is received, or Audio In mode is not employed, then the LED is lit as a power indicator.

### Power Switch

When pushed in at the bottom ("0"), the power is OFF. When pushed in at the top ("1"), the power is ON. The SMPTE/Power LED should light when the switch is in the ON position if the power cord is connected to the Studio 5 and plugged in.

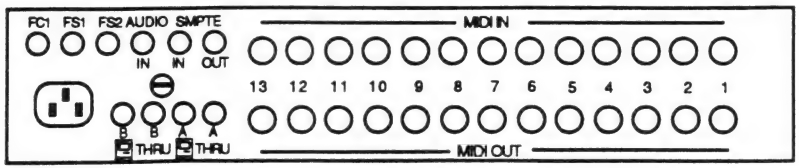



**Diagram of the Back Panel of the Studio 5**

Clockwise from the upper left, the Studio 5's rear panel connectors are as follows:

## Footswitch Connectors

These connectors allow for connection of Opcode's SoftShoes™, or other momentary and continuous foot pedals, with a 1/4" phone plug.

### *FC1*

This input is for a continuous control foot pedal (Opcode's SoftShoes foot controller uses a 100k logarithmic taper). The Studio 5 will read the position of the pedal and interpret a MIDI value between 0 and 127. Foot controllers are ideal MIDI controllers for such effects as panning, portamento, or volume control. The foot controller can be toggled on and off within the Studio 5/OMS software. See "The Studio 5 Menu" in Chapter 6 for details. FC1 transmits on Channel 15 and is assigned to MIDI controller numbers 15 and 47.

### *FS1 and FS2*

These two inputs are for a momentary (or on/off) footswitch. The Studio 5 sends a value of 127 when the foot pedal is depressed and a value of zero (0) when the foot pedal is released. FS1 is MIDI controller number 78; FS2 is number 79.

You can use either a normally open or normally closed footswitch—the Studio 5 will recognize the type upon powering up. You must plug in the footswitches prior to turning on the Studio 5—this will enable the unit to recognize the footswitches' polarity. Do not step on any footswitches while turning on the Studio 5 so that the correct polarity can be determined.

***NOTE:** The footswitches and foot controller will, normally, transmit on Channel 15. This channel can be changed when the footswitches and the foot controller are used in OMS patches or as Virtual Controllers. See "Using Studio 5 Footswitches in Patches" in Chapter 5.*

Footswitches make ideal MIDIKeys in Opcode's Vision sequencer — one switch could be used as the MIDIShift. The foot controller can also be used to control any of the faders.

Foot pedals are available through Opcode Systems or your local music dealer.

### Audio/SMPTE Connectors

These three connectors are used for SMPTE and audio syncing. They are unbalanced stereo connectors capable of accepting either 1/4" mono phone plugs or stereo tip/ring/sleeve connectors. Input impedance is 500 kΩ. SMPTE output impedance is less than 100 Ω.

*Audio IN*

This is an audio input that Vision or Studio Vision can use as a sync source. Any steady audio beat like a drum or bass can be used as the timing source. This allows you to add synchronized virtual tracks to a tape that was recorded without using SMPTE timecode. See Appendix C for a tutorial on using the Audio IN feature with Vision and Studio Vision.

*SMPTE IN*

This is connected to the output of a tape deck's SMPTE track. When SMPTE is received on this input, the Studio 5 will convert the SMPTE into MIDI Time Code or Direct Time Lock, and will also regenerate the SMPTE signal out the SMPTE OUT jack.

*SMPTE OUT*

This jack is normally connected to a tape deck's line input and is used for striping a tape or regenerating a SMPTE signal.

### MIDI IN Connectors

These inputs are connected to the MIDI OUTs of any MIDI equipped devices that are to send MIDI to the Macintosh.

### MIDI OUT Connectors

These outputs are connected to the MIDI INs of any MIDI equipped devices that are to receive MIDI from the Macintosh.

### Computer Ports and Thru Ports

The Studio 5 does not implement the traditional Macintosh MIDI interface concept of a "Printer port" and a "Modem port". Older interfaces used to be limited to 32 addressable MIDI channels; 16 on the Printer port and 16 on the Modem port. The Studio 5, however, can address up to 240 separate MIDI channels spread across its two serial inputs. These input ports are labeled "A" and "B". The inputs (with the little Macintosh icons) attach to the Macintosh using standard 8-pin serial din cables (supplied by Opcode with the Studio 5). It doesn't matter whether the A or B ports are connected to the Macintosh's Modem or Printer ports—only that you remember which way you did it.

***IMPORTANT:*** *If you are using only one Studio 5 port, it must be the A port, regardless of whether it is connected to the Macintosh's Modem or Printer port.*

Attach external peripherals (such as a printer or modem) to the Studio 5's "A Thru" and/or "B Thru" ports. These peripherals can then be used without having to disconnect the Studio 5 from the Macintosh. Simply use the corresponding front panel THRU switch to route data arriving at one of the Studio 5 computer ports to its corresponding thru port (see "Thru Switches" earlier in this chapter, and "Computer Connections" in Chapter 3).

### Power Cord Connector and Fuse

The factory supplied 3-prong power cord plugs into this socket. Note that units are shipped from the factory configured for either 110V or 220V and are supplied with the appropriate cables. Check that you have the correct model for the voltage in the country where you will be using your unit. Should your Studio 5 ever require a change in voltage, it can be modified by a qualified technician.

The Studio 5 uses a 1 amp/250V fast blow fuse. It should be replaced *only* with the same type and rating.

## ABOUT THE INTERFACE CABLES

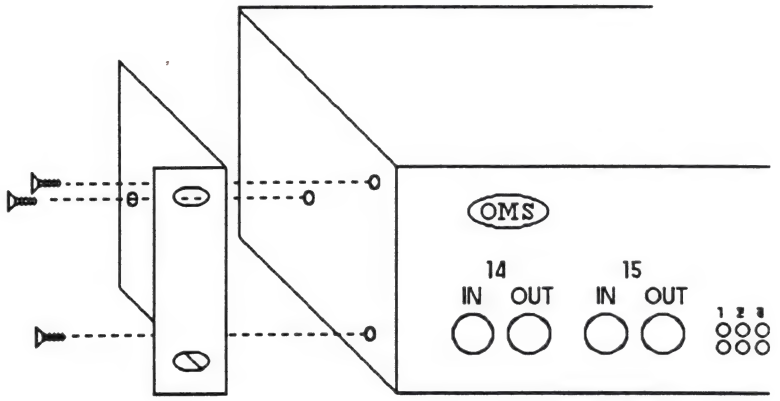
The cables that come with the Studio 5 are standard 12' Apple Imagewriter II cables. The Studio 5 will communicate with your Macintosh over this length of cable. If you are using cables other than the ones supplied with the Studio 5, please ensure that they are Imagewriter II compatible cables.

***NOTE:*** *The Macintosh 512K requires a "Circular 8" to "DB-9" cable. This cable is NOT available directly from Opcode Systems except in an 18" version (Opcode P/N: 020-0000-00), but can be purchased at some computer stores or mail order houses.*

You should use only high quality shielded MIDI and audio cables when operating your Studio 5.

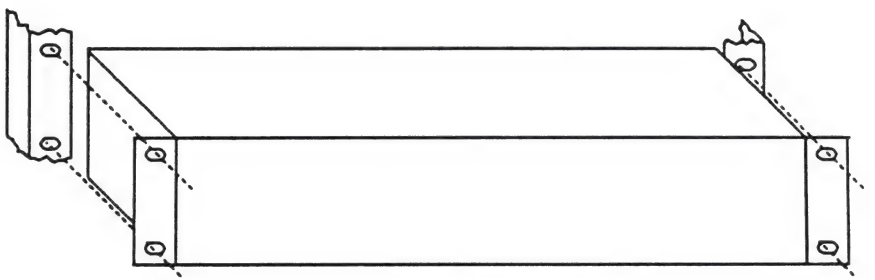
# 3 Installation and Setup

Rack ears are provided for rack mounting the Studio 5. These ears are installed on either side of the unit with the screws provided.




**Installing Rack Mount Ears**

The Studio 5 is designed to be mounted in a standard 19" equipment rack with the 13 pairs of MIDI connectors facing rearward. When rack mounting, you should leave at least 1" clearance above and below the Studio 5.



**Installing Studio 5 Into Equipment Rack**

If you do not wish to rack mount the Studio 5, it can rest on a steady surface. Attach the four rubber feet (provided in this package) to the bottom of the unit to prevent it from sliding.

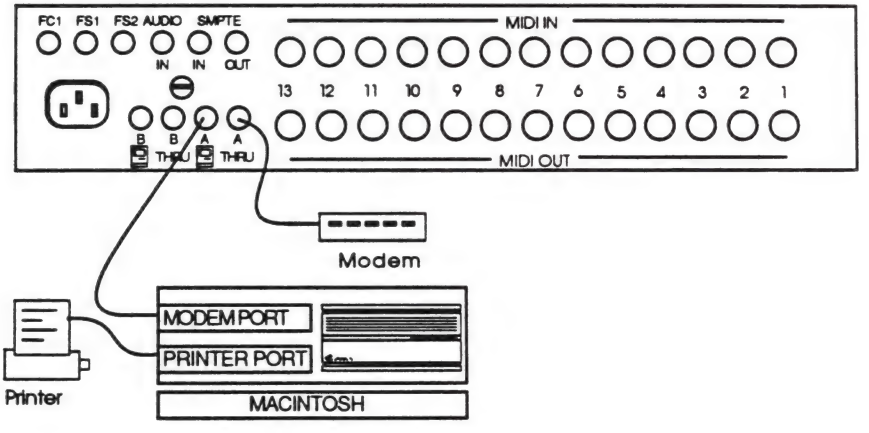
*NOTE: To avoid interference with your monitor, the Studio 5 should be located at least two feet away from your computer's video display.*

## COMPUTER CONNECTIONS

The Studio 5 can connect to either the Macintosh's Modem port, Printer port, or to both. If you frequently use the serial ports for non-MIDI purposes (such as printing) while running MIDI applications, you may wish to use only one cable between the Macintosh and the Studio 5. If, however, you need to take advantage of increased MIDI "throughput" (that is, your MIDI data is densely packed with notes, continuous controls, System Exclusive messages, and MIDI Time Code), you should connect both Studio 5 ports to the Macintosh.

Connect the supplied serial cables between the Studio 5 and the Macintosh as shown in the following examples. Connection A illustrates a single port hook-up. Connection B illustrates a dual port hook-up. It doesn't matter whether ports "A" or "B" are connected to the Macintosh's Printer or Modem ports, but as a matter of convention, you might wish to connect "A" to the Modem port and "B" to the Printer port.

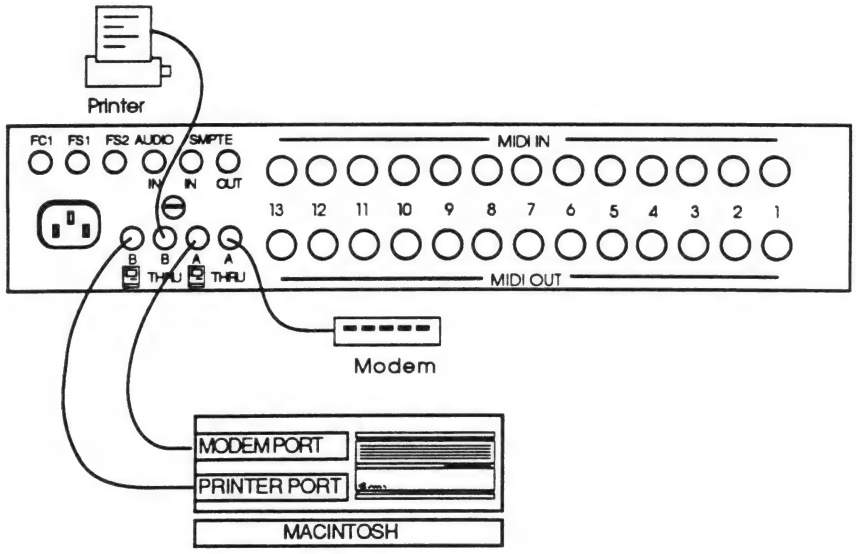
***IMPORTANT:** If you are using only one Macintosh serial port for MIDI (either Modem or Printer), that port must be connected to the Studio 5's "A" port.*




**Connection A: Single (Modem) Port Hook-Up**

The above connection uses only one of the Macintosh's serial ports (the Modem, in this case) for transmitting MIDI data to the Studio 5. A Modem is attached to the Studio 5's "A THRU" jack, allowing it to be switched in or out from the front panel. The printer is plugged directly into the Macintosh.

The connection shown below illustrates both Macintosh serial ports attached to the Studio 5. External peripherals are connected to the Studio 5's THRU jacks and can be switched in or out from the front panel.

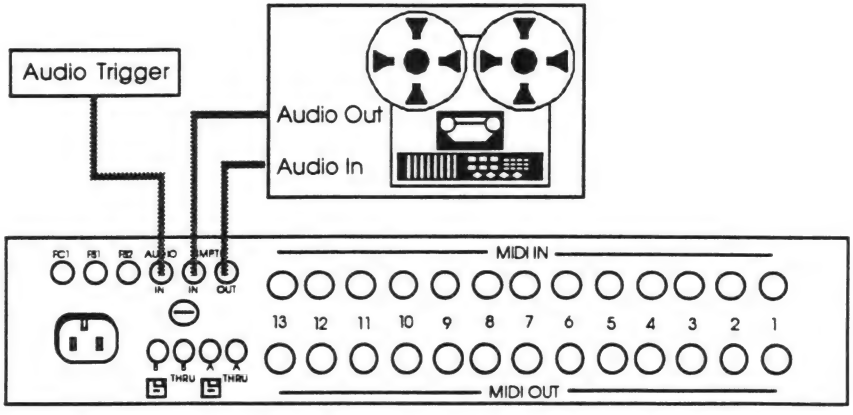



**Connection B: Dual Port Hook-Up**

***NOTE:*** *In a two cable system, such as shown in Connection B, data is distributed between the two cables as follows: OMS balances data sent from the Macintosh to the Studio 5 as equitably as possible. When data is sent from the Studio 5 to the Macintosh, all MIDI data originated by the Studio 5 (timecode, Studio 5 footswitch, Studio 5 foot controller, Audio In note events) will be sent out the Studio 5's "B" port. All other data coming from MIDI devices connected to the Studio 5 is sent out the Studio 5's "A" port. This prevents the Studio 5's timecode from getting overwhelmed by data coming from any connected MIDI devices.*

## AUDIO CONNECTIONS

The Studio 5 has three audio jacks on its rear panel. The SMPTE IN jack is used to receive a tape sync signal. The SMPTE OUT sends SMPTE time code. The time code format is specified in the Studio 5/OMS Setup software (or is a duplicate of the SMPTE signal received at the SMPTE IN jack). The AUDIO IN is used to receive an audio trigger signal.



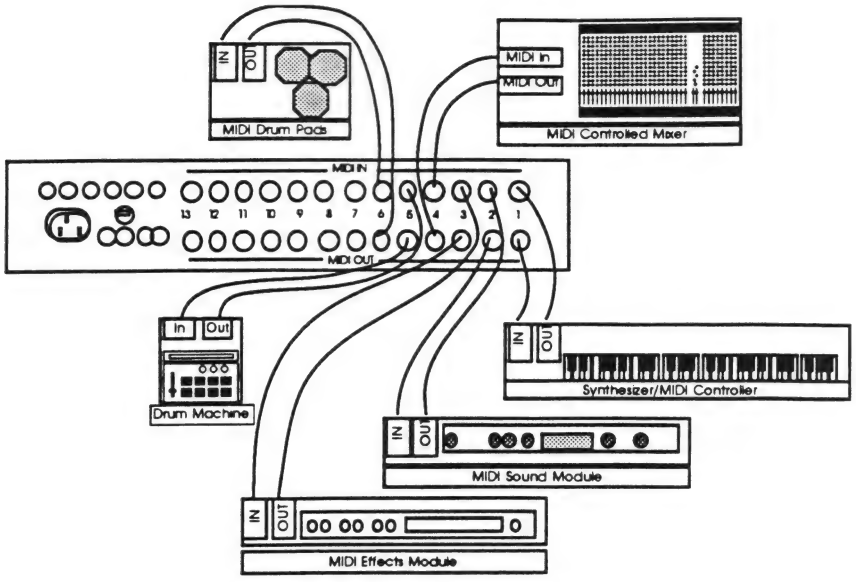

**Audio Connections**

To use the Studio 5 as a synchronization device, connect a pair of shielded audio cables between the Studio 5 and a multi-track tape deck. The SMPTE OUT jack should be connected to the audio input (usually of the last track) of a tape deck for SMPTE striping. The SMPTE IN jack of the Studio 5 should be connected to the audio output of the multi-track's SMPTE track. The Studio 5 should be connected directly to the tape deck, bypassing the mixing console, EQ, or any signal processing equipment.

When using the Studio 5 as a tempo controller, the AUDIO IN can be connected to any audio output (e.g., bass drum, tape deck, microphone, bass guitar, etc.). Vision version 1.1 (or later), will sync to an audio trigger received at this input. See Appendix C for a tutorial on using Vision and Studio Vision with the Audio Input feature.

## MIDI CONNECTIONS

The fifteen pairs of MIDI jacks (13 on the back, 2 on the front) are used to connect your studio's various MIDI devices. Connect a MIDI device's MIDI input to one of the Studio 5's MIDI OUT jacks. Connect the like-numbered Studio 5 MIDI IN jack to the device's MIDI output. The following illustration shows some typical MIDI connections.

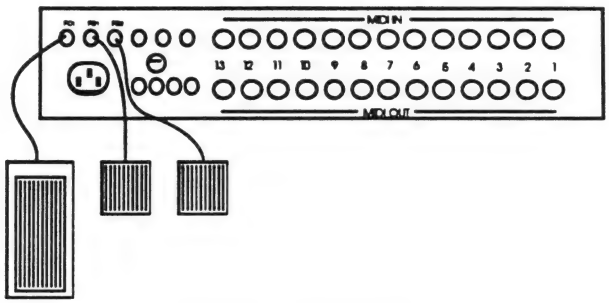



**MIDI Connections**

***IMPORTANT:*** *To ensure successful patch transfers, connect both MIDI ports (IN and OUT) of a device to a numbered pair of MIDI ports (IN and OUT) on the Studio 5.*

## FOOTSWITCH CONNECTIONS

Two optional footswitches (FS1 and FS2) and an optional foot pedal (FC1) can be inserted into the Studio 5. These footswitches can perform numerous programmable functions depending on the Macintosh software being used. For more information, see the "Footswitch Connectors" section in Chapter 2, "Using Studio 5 Footswitches in Patches" in Chapter 5, or consult your Vision manual for information about using footswitches as MIDIKeys.




**Footswitch Connections**

Whether you have used OMS before or not, you should use the Studio 5/OMS Installer provided on the Studio 5/OMS disk to update any OMS files or drivers that might be on your hard disk. Detailed Installer instructions are in your OMS manual.

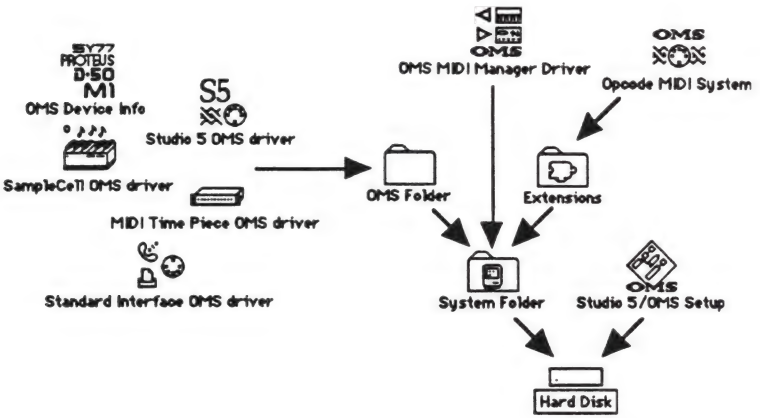
- Insert the Studio 5/OMS disk into your floppy drive, double-click the Studio 5/OMS Installer, and choose from the dialog box that opens the items you want to install.

The Installer will place them in the proper folders on your hard disk. The Studio 5/OMS Setup application will be placed on the top level of your hard disk; put it in whatever folder is most convenient for you. If you've used OMS before, you'll notice that the Studio 5/OMS Setup application replaces the OMS Setup application; its functions duplicate and extend the OMS Setup application.

- Restart your Macintosh.

*NOTE: If you experience a crash when running the Studio 5/OMS Installer, remove any virus-checking INITs from your System folder (Extensions folder for System 7), restart your Macintosh, and run the Installer again.*

The following reference diagram (for System 7) illustrates where the Studio 5/OMS Installer places files.




If you had been using OMS prior to installing the Studio 5, your previous Studio Setup documents will be read by the new Studio 5/OMS Setup application with minor modification (see "Launching the Studio 5/OMS Setup Application" later in this chapter).

***IMPORTANT:** Do not relocate, rename, or delete any files or folders that Studio 5/OMS Installer places in the System folder.*

All programming and setup of the Studio 5 is handled by OMS. If you have never worked with OMS, please read the OMS manual before continuing with the Studio 5 manual.

## POWERING UP THE STUDIO 5

When you power up the Studio 5, it goes through a process called network synchronization. During this time, the Studio 5 examines both of its serial ports to see what is connected. As this is done, you'll see it display the number "1" in the middle of its display for one second, and then display the current patch number. The "1" indicates that the Studio 5 is connected to a Macintosh. The current patch will be "0" the first time the unit is turned on. Later, as patches are defined and stored, the Studio 5 will remember the last patch selected prior to shutting down.

## LAUNCHING THE STUDIO 5/OMS SETUP APPLICATION

After connecting the Studio 5 to the Macintosh and powering up, double-click the **Studio 5/OMS Setup** icon located on your hard drive.

Studio 5/OMS Setup

If you have yet to create an OMS Studio Setup document, a dialog will ask if you want to create a new Studio Setup. Click on **New Studio Setup**, and when the next dialog box appears, tell it which ports to search, then click **OK** (see the OMS manual for details on creating Studio Setup documents). You should only search those ports that are connected to the Studio 5.

If you already have a Studio Setup document, but it doesn't reflect your current studio configuration (for example, you had a standard interface, but are now using the Studio 5), simply choose the **Interfaces** command in the **Studio** menu. When the dialog box appears, click the **Update Setup** button. Your old interface will disappear from your Studio Setup document and be replaced by a Studio 5 icon. The devices that were attached to the standard interface will become unconnected; simply connect them to the Studio 5 to reflect your new studio cabling. Also, your previous Current Studio Setup document will need to be made current, again. To do so, select **Make Current** from the **File** menu. A diamond next to the Studio Setup document's name in the title bar indicates that the document is current.

### Studio Setup Icons for the Studio 5

There are numerous ways to represent a Studio 5 in the OMS Studio Setup document. If only the Macintosh's Modem port is connected to the Studio 5's "A" port, the Studio 5 will be represented as follows:

Studio 5–Modem

If only the Macintosh's Printer port is connected to the Studio 5's "A" port, the Studio 5 will be represented this way:

If both Macintosh serial ports are connected to the Studio 5 (e.g. Modem port to "A" port, Printer port to "B" port), OMS will display a single Studio 5 icon as follows:

Notice that, unlike a standard interface connected to both serial ports, you see only one Studio 5 icon. A standard interface appears as two icons; one representing the Modem port connection and the other the Printer port connection. The Studio 5 is shown as a single interface because OMS will allocate MIDI data automatically to each of the serial ports. The data loads will be kept even between the two ports, optimizing MIDI transmission.

# 4 OMS Patches

The Studio 5 contains internal memory for up to 128 patches (although it may hold fewer than 128 patches depending on their complexity). Patches connect MIDI devices and may include optional MIDI processing between them. They're designed within the Macintosh using OMS, and are stored in Patch documents. The Macintosh can store an unlimited number of Patch documents, each containing up to 128 patches. Any Patch document can be opened, made current, and sent to the Studio 5 at any time. A Patch document may contain:

- Up to 128 patches
- Any number of Virtual Controllers (as limited by memory)
- Any number of Virtual Instruments (as limited by memory)
- Any number of Program Change Sources (as limited by memory)

Patches are strictly real-time, live-playing MIDI connections; they do not actually affect the MIDI data that an application sends or receives. MIDI applications will always receive from the sources to which they are connected and be able to send to any destinations, regardless of what the current patch does.

Virtual Controllers, Virtual Instruments, and Program Change Sources will each be discussed in depth later in this chapter.

***IMPORTANT:*** *Patches are a feature of OMS, not just the Studio 5. This means devices that aren't attached to a Studio 5 (such as a SampleCell card) can still be used in Patch documents. It's important to recognize that the Studio 5 is not a self-contained box—it's designed to function as part of a larger OMS system. You must be using at least one Studio 5, however, in order to work with Patch documents.*

***IMPORTANT:*** *Since most sequencers control MIDI thruing from within the application, it's useful to keep patch #1 as an "empty" or "do nothing" patch for use with sequencer programs.*

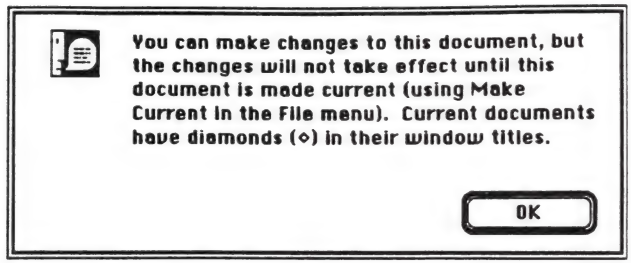
## PATCH BASICS

This section will discuss techniques for working with Patch documents and patch editing windows. It will also cover basic terminology and editing techniques.

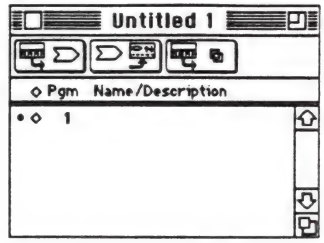
### Opening a New Patch Document

- Open a new Patch document by choosing **New Patch Document** from the **File** menu (or type ⌘N).

You'll see a dialog box telling you that the document must be made current before any changes can take effect.

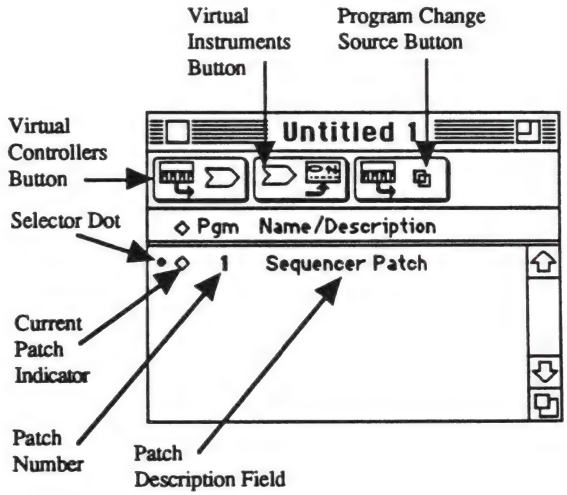

You can make changes to this document, but the changes will not take effect until this document is made current (using Make Current in the File menu). Current documents have diamonds (◇) in their window titles.
OK

- Click **OK** and a new, untitled Patch document window will open.




**Patch Document Window**

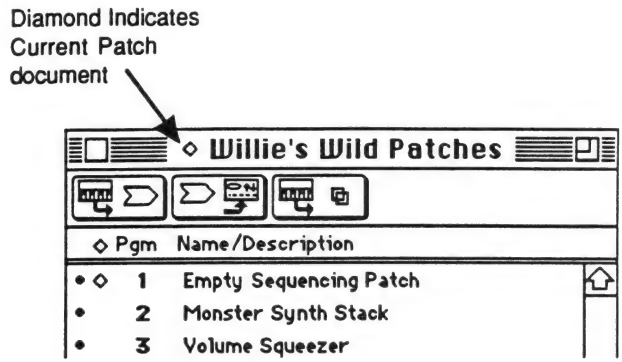
## Patch Document Window Terminology

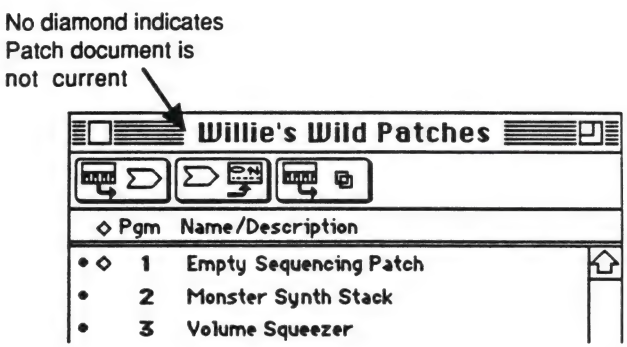



**Anatomy of a Patch Document Window**

When you open a new Patch document window, you'll see three buttons under the title bar. From left to right these represent Virtual Controllers, Virtual Instruments, and Program Change Sources. Each of these buttons will be defined later in this manual. Below the buttons is a line for the first patch in the document. This line consists of a selector dot, a diamond to indicate the current patch, the program (or patch) number and a Name/Description field that can hold as much text as needed to describe the operation of that patch.

You can have any number of Patch documents open at one time, but only one document can be the *current* Patch document. The current Patch document is indicated by a diamond next to its name.




The current Patch document always reflects the exact state of your Studio 5. Any changes made to a current Patch document are reflected immediately in the Studio 5, and any time that a Patch document is made current, the Patches in that document are sent immediately to the Studio 5.

Patch documents are based on the devices defined in the current Studio Setup document. If you make a different Studio Setup document current, your current Patch document may not know about the devices in the new Studio Setup document. Similarly, the new Studio Setup document may not know about the devices referenced by the current Patch document.

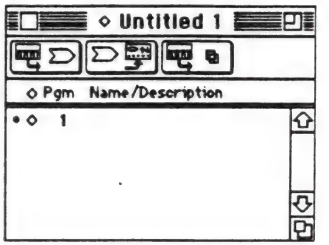
***NOTE:*** *If you create two identical Studio Setup documents, with identical names for identical instruments on identical ports, OMS will see the devices as different.*

## Making Patch Documents Current

- Choose **Save And Make Current** from the **File** menu.

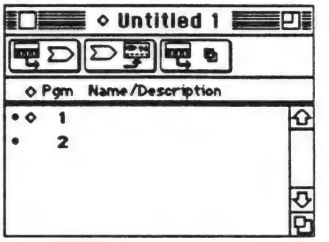
You'll see a standard Macintosh Save As dialog box. Save the file in the same folder as your Studio 5/OMS Setup application. A diamond will appear next to the Patch document's name indicating that it is now the current Patch document.

If a Patch document has already been saved, the **Save And Make Current** command will become simply a **Make Current** command.




## Adding Patches to a Patch Document

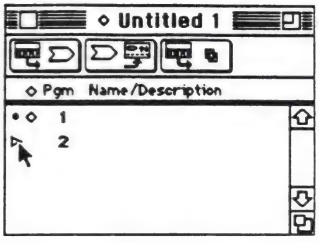
- Choose **New Patch** from the **Patch** menu, or type **⌘P** to add a new patch to the document.




**Adding a Patch**

Unselected patches have a bullet dot to their far left. This is the patch selector dot. Selected patches have a small triangle instead of a bullet dot.

- Click a patch's selector dot to select a patch; the bullet will turn into a triangle.



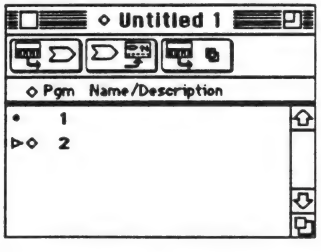

**Selecting Patch #2**

Shift-clicking other selector dots will select additional patches.

## Making Patches Current

The diamond to the right of the selector dot is the current patch indicator. You make a patch current by clicking in the column where the diamond would appear, or by selecting a patch and choosing **Recall Patch** (⌘R) from the **Patch** menu.

- Click in the column to the right of Patch #2's selector dot



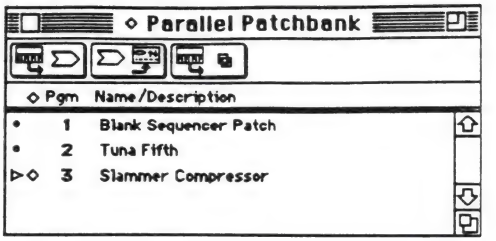

**Making Patch #2 the Current Patch**

Patch #2 becomes the current OMS patch (as indicated by the diamond). The current patch is the patch that is being used by OMS and the Studio 5.

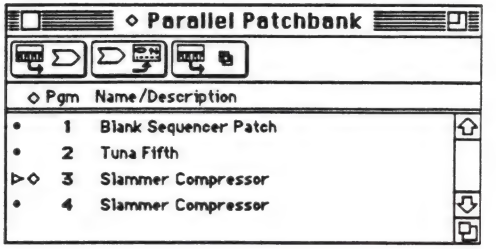
## Copying and Pasting Patches

You can copy and paste whole patches to new locations. If, in the following example, you wanted to copy patch #3 as the basis for building a new patch, you would:

- Click Patch #3's selector dot to select it.
- Choose **Copy** (⌘C) from the **Edit** menu.




- Choose **Paste** (⌘U) from the **Edit** menu.



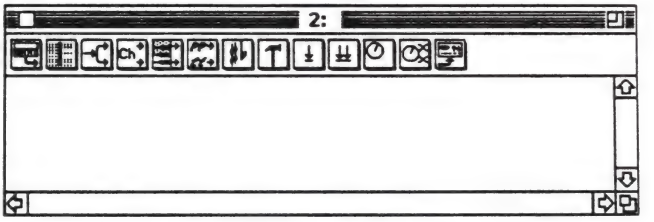

Patch #3 is copied to the lowest available patch location which, in this case, is Patch #4. Patch #4 is now an exact duplicate of Patch #3.

***NOTE:** When a Patch document window is active, the **Paste** command always pastes to an undefined patch. You cannot paste the copied patch to an existing patch.*

Patches can also be cut to the Clipboard or cleared.

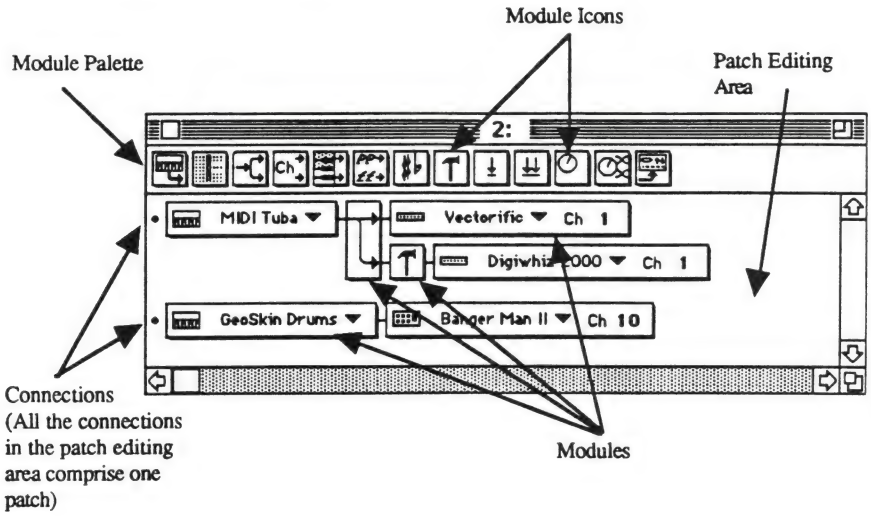
## Opening a Patch Editing Window

- Select a patch and choose **Edit Patch** from the **Patch** menu, or double-click its selector dot. A patch editing window will open.




**Empty Patch Editing Window**

## Patch Editing Window Terminology




**Anatomy of a Patch Editing Window**

A basic patch editing window is shown above. The window contains a row of module icons across the top of the screen. Each of these icons represents a MIDI Source, MIDI Destination, or MIDI Processing module. The row of module icons is called a module palette. The patch editing area contains "connections", each of which is comprised of a MIDI Source module and all modules connected to its right. Any amount of MIDI processing can be applied to any connection. An OMS patch is made up of all the connections in the patch editing area.

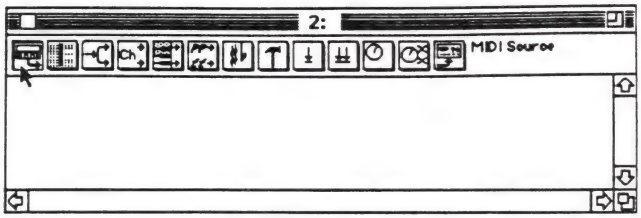
***IMPORTANT:*** *Since most sequencers control MIDI thruing from within the application, it's useful to keep patch #1 as an "empty" or "do nothing" patch for use with sequencer programs.*

## Creating Connections

This section discusses the techniques needed to create a connection. Later in this chapter, specific details concerning each type of module will be discussed.

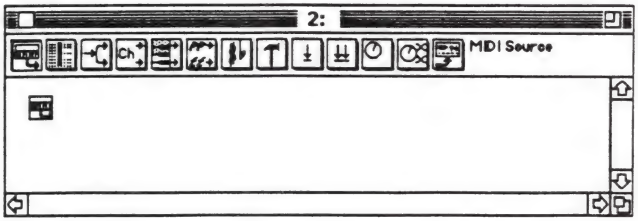
- Click the leftmost module icon in the module palette.

This is the MIDI Source (or controller) icon. When you click it, its name is shown to the right of the module palette.

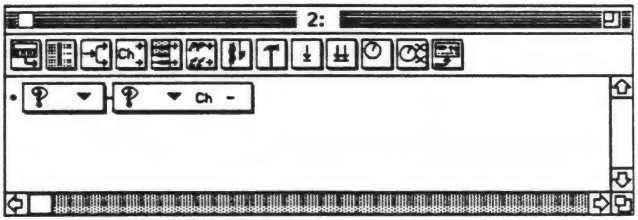



- Move the cursor into the patch editing area.

The cursor will become a MIDI Source module icon.

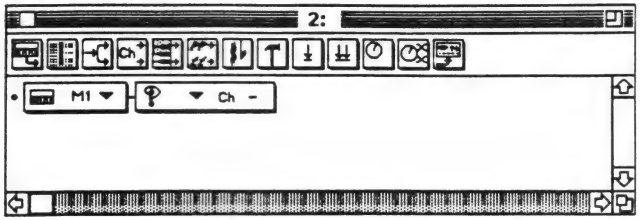



- Click in the patch editing area to create an undefined connection.



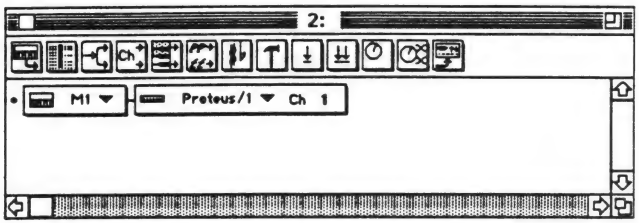

A connection appears as a selector dot along with some number of connected modules. Every connection needs both a MIDI Source and a MIDI Destination module. MIDI Source and MIDI Destination modules will be explained in detail in the "Modules" section which follows shortly. When a MIDI Source module is first placed in the patch editing area, both an undefined MIDI Source module *and* an undefined MIDI Destination module will appear. Each module contains a question mark until you choose a device from each module's pop-up menu.

- Click the downward facing triangle of the MIDI Source module to see a menu of the devices that you have specified in your Studio Setup document. Select a device from the pop-up menu.




**Selecting a MIDI Source Device**

- Click the pop-up menu triangle in the MIDI Destination module and choose a destination device.



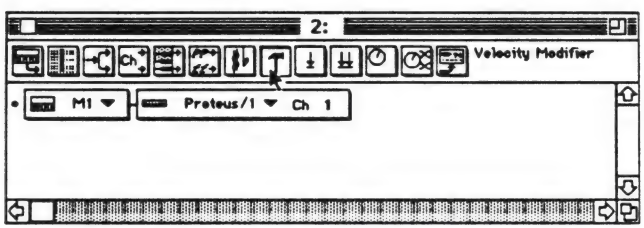

**Selecting a MIDI Destination Device**

You've created a simple connection; the M1 sends MIDI data directly to Channel 1 of the Proteus/1. When you play the M1, the Proteus will play on MIDI Channel 1.

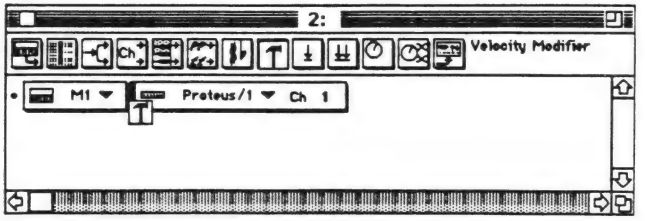
## Adding MIDI Processing

Use MIDI processing modules to filter, split, transpose, modify, or map MIDI data in a variety of ways. In the following example, you'll add a Velocity Modifier module to your connection. Velocity Modifier modules (and other MIDI processing modules) will be discussed in the "Modules" section which follows shortly.

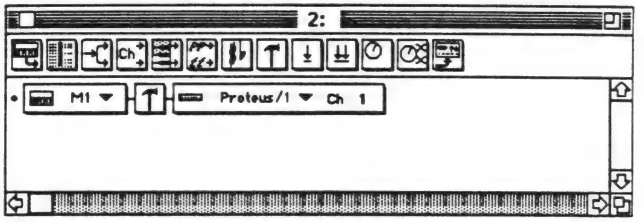
- Click the Velocity Modifier Module icon (the little hammer) in the module palette. When you click it, its name will be shown to the right of the module palette.



- Move the cursor into the patch editing area. The cursor will become a Velocity Modifier module icon (little hammer).
- Position the cursor over the space between the MIDI Source and MIDI Destination modules. The area will become highlighted.

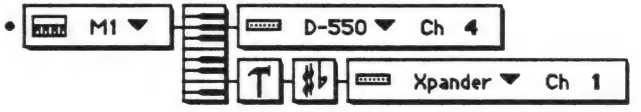



- Click the mouse to insert the module.

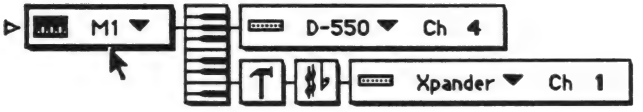



## Selecting Modules and Connections

You can select a module or group of modules for cutting, copying, or pasting. To select a module, click anywhere within it. A selected MIDI Source or MIDI Destination module will have a thick border. A selected MIDI processing module becomes highlighted.




**Unselected Modules**

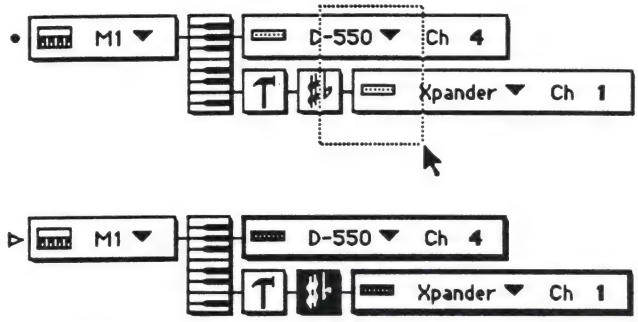



**Single Selected Module**

Shift-clicking a second module when one is already selected will select the second module *and* all modules between it and the first one.

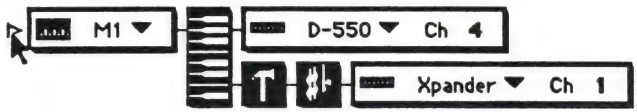
**Shift-Clicking on a Second Module**

You can also select multiple modules by clicking in the white space around them and dragging out a rectangle. All modules that intersect the rectangle become selected.



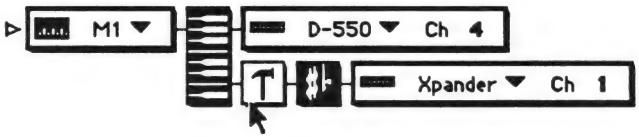

**Selecting Modules by Dragging Out a Rectangle**

You can select all modules in a connection by clicking the selector dot to the left of the modules.




**Selecting All Modules**

Command-clicking modules (⌘-click) will either add or remove them from the selection. An unselected module will become selected. A selected module will become deselected. In the example, below, ⌘-click the Velocity Modifier module to deselect it.

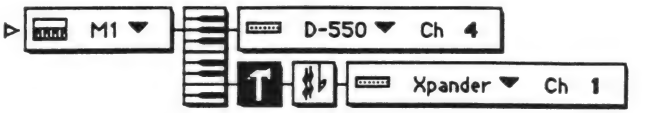



**Command-Clicking to Deselect Module**

## Copying/Pasting Modules and Connections

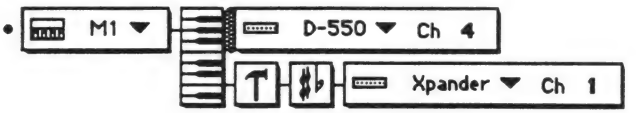
You may cut, copy, or clear selected modules. You cannot, however, cut or clear a Splitter module if it has more than one output. To remove a Splitter module, you must first remove all but one of its outputs.

A cut or copied module can be pasted into a new location by clicking the desired location and selecting the **Paste** command. The contents of the Clipboard are inserted into the selected space. In the following example, the Velocity Modifier module is copied by clicking it and choosing **Copy** from the **Edit** menu.



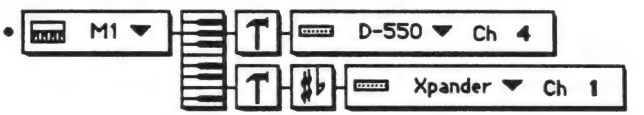

**Selected Module for Copying**

- Place an insertion point between the Splitter module and the D-550 Destination module by clicking the blank space between them (the space will become highlighted).




**Selecting Paste Location**

- Choose **Paste** from the **Edit** menu to copy the Velocity Modifier module and all of its parameters.



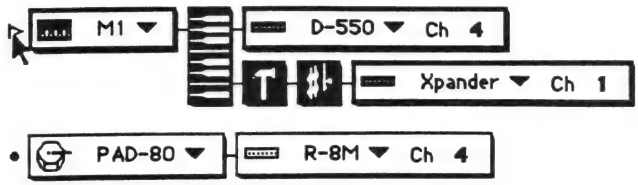

**Results of Pasting**

You may copy and paste entire connections without selecting a paste destination. The pasted connection appears below all other connections in the patch editing area.

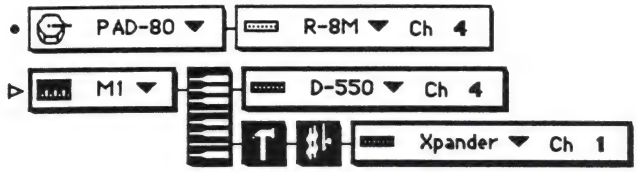
Selected connections or modules may also be cut to the Clipboard or cleared.

### Changing Connection Order

You can Option-drag any connection's selector dot to rearrange the patch editing area. In the following example, Option-click the top connection's selector dot.

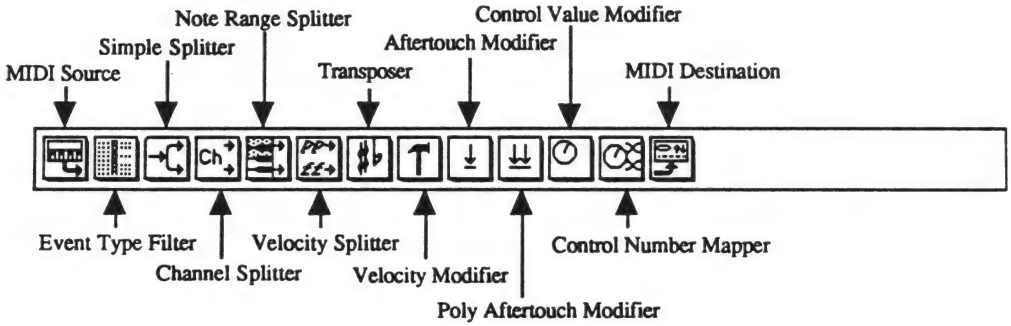



Then, while still holding down the mouse button, drag the entire connection below the lower connection. When you release the mouse, the connection order is changed.




## MODULES

This section describes how to configure and use each of the modules in the Module Palette.




**Module Types**

## MIDI Source Module

A MIDI Source module represents the device that is initiating MIDI data transmission. When you first insert a MIDI Source module, a question mark appears. To select a MIDI source, click the downward-pointing triangle to open a pop-up source menu, which contains all sources as defined in the current Studio Setup document. It also contains any Virtual Controllers (discussed later in this chapter) that are defined in the current Patch document. Simply choose a MIDI source from the pop-up menu to define this module.

The Studio 5 can also be a source of MIDI data. Timing information (MTC, DTL, DTLe), footswitches (FS1, FS2), and foot controller data (FC1) are sent from the Studio 5. Also, the Studio 5 is a note source when Audio In is enabled and in use. Select the Studio 5 as the MIDI source if you wish to use timing data, footswitches, the foot controller, or Audio Input in an OMS patch.

When MIDI sources are defined, they reference devices in the current Studio Setup document. If you open a patch and find a MIDI source module's device name is greyed-out, then the current Patch document probably references a different Studio Setup document than the one on which the patch is based. You can simply make the old Studio Setup document current, or select a different module for every one that is greyed-out. If you want to use the current Patch document with your new current Studio Setup document, copy the devices from your original Studio Setup document into your current Studio Setup document.

***NOTE:*** *If you create two identical Studio Setup documents, with identical names for identical instruments on identical ports, OMS will see the devices as different.*

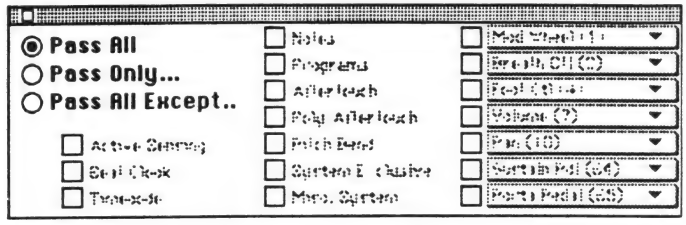
## MIDI Destination Module

A MIDI Destination module represents the device that is the final recipient of MIDI data. When you first insert a MIDI Destination module, a question mark appears. To select a MIDI destination, click the downward-pointing triangle to open a pop-up destination menu, which contains all destinations as defined in the current Studio Setup document. It also contains any Virtual Instruments (discussed later in this chapter) that are defined in the current Patch document. Also, the module contains a channel numerical for setting the channel of the MIDI data being sent to the device. This channel numerical can be set to "–", which means that the MIDI data's channel number remains the same as the channel on which it was sent.

MIDI destinations, like MIDI sources, are based on the current Studio Setup document. See the discussion under "MIDI Source Module" if device names are greyed-out in the MIDI Destination module.

## Event Type Filter Module

An Event Type Filter module removes various types of MIDI events from the data stream. Double-click its icon after inserting it into the connection. You'll see the following dialog box.

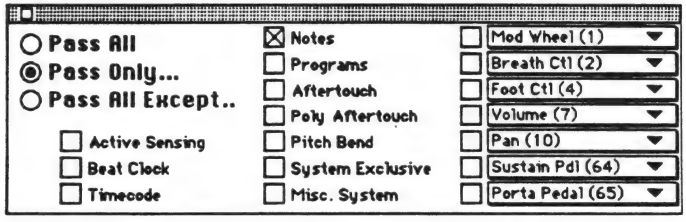



**Event Type Filter Editing Window**

The three radio buttons control whether the filter will **Pass All** events (useful for temporarily disabling the filter), **Pass Only** certain types of events, or **Pass All Except** certain events.

Checked boxes remove those event types when **Pass All Except** is chosen. Checked boxes pass those event types through the filter when **Pass Only** is chosen.

In the following example, only notes are passed through the Event Type Filter module. All other MIDI events are filtered out.




Up to seven MIDI continuous controls can be filtered; choose them from the pop-up menus next to the rightmost column of check boxes.

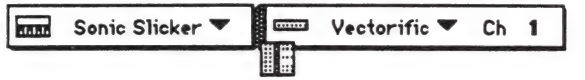
"Misc. System" events include Song Select, Tune Request, System Reset, and any other MIDI events not covered by other selections.

***NOTE**: Direct Time Lock, and MIDI Time Code's Full and User Bits messages will not pass properly through an Event Type Filter unless System Exclusive events are allowed to pass.*

Let's say, for example, that you want to layer a sound from your "Sonic Slicker" synthesizer with a sound from your "Vectorific" sound module—but you want the Sonic Slicker's Modulation Wheel to affect *only* the Sonic Slicker's sound and *not* the Vectorific sound.

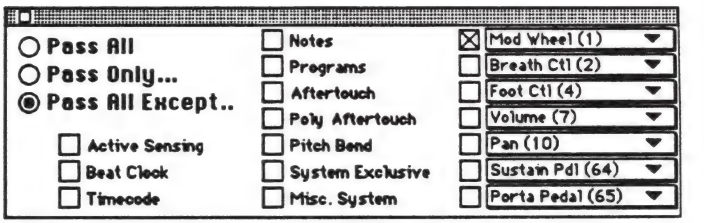
- Choose **New Patch** from the **Patch** menu.
- Double-click the new patch's selector icon to open a blank patch editing window.
- Click the MIDI Source module, then move the cursor into the patch editing area and click. You will create an undefined connection.
- Choose "Sonic Slicker" from the pop-up MIDI source menu and "Vectorific" from the pop-up MIDI destination menu (obviously, these synthesizers won't be in your Studio Setup document, but are presented here as an example).

- Click the Event Type Filter module, and move the cursor between the Source and Destination modules. The area will become highlighted.




- Click the mouse to insert the Event Type Filter module.

- Double-click the Event Type Filter module and an editing window will appear.
- Choose **Pass All Except** and check the **Mod Wheel (1)** box to pass all MIDI events except the modulation wheel through to the "Vectorific" sound module.




- Choose **Save** from the **File** menu.

In the future, when you need to play a Sonic Slicker/Vectorific stack with modulation wheel data filtered out, you can recall this patch.

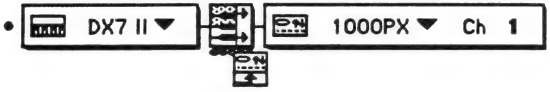
*NOTE: The Event Type Filter module is useful for "thinning" the MIDI data stream prior to sending it to a Splitter module (discussed in the following section). A Splitter module can and often does increase the amount of MIDI data, so it's desirable to remove unwanted data before it's duplicated by a Splitter module.*

## Splitter Modules

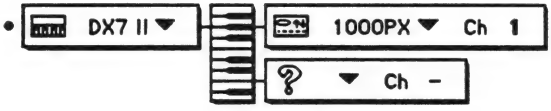
A Splitter module can take a single MIDI source and send it to multiple destinations. There are four kinds of Splitter Modules: Simple, Channel, Note Range, and Velocity.

When you first insert a Splitter Module into a connection, technically it isn't a splitter yet, since it's sending to only a single destination:

To create a second output from the Splitter module, click any module icon in the palette (except the MIDI Source module icon), place the cursor below the splitter to highlight the area.



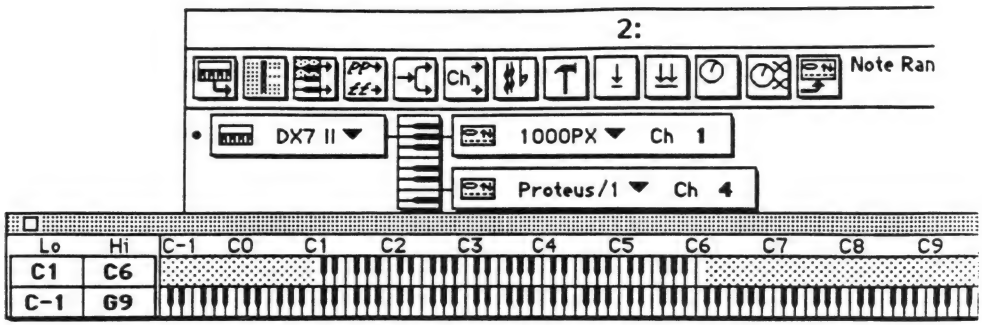

Click the mouse and the connection looks as follows:



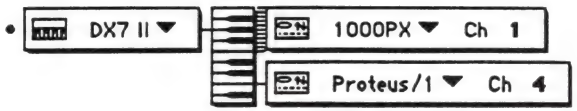

You can add as many outputs as necessary underneath the splitter.

### *Editing Splitter Modules*

Channel, Note Range, and Velocity Splitter modules can be edited. Simple splitters cannot. Double-click anywhere within an editable Splitter module to open its editing window. Splitter module editing windows contain one line for each output of the splitter. In the following example, the top keyboard edits the note range of the 1000PX (the top MIDI Destination module) and the bottom keyboard edits the note range of the Proteus/1 (the bottom MIDI Destination module).



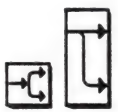

Moving the cursor over an editing line highlights that section of the splitter in the connection. This makes it easy, when an input is split into many outputs, to keep track of which output's split parameters you are editing.




**Highlighted Splitter Section**

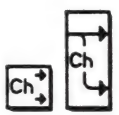
***NOTE:** A splitter module must have something connected to its output in order to be edited.*

### *Simple Splitter Module*

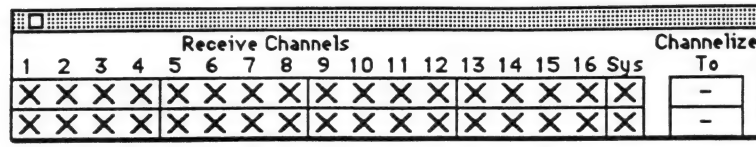


A Simple Splitter module sends one MIDI source to multiple destinations. A Simple Splitter module has no editing window.

### *Channel Splitter Module*




The Channel Splitter module splits the MIDI data by channel and, if desired, changes each output's MIDI channel. To open an editing window, insert a Channel Splitter module into a connection, then double-click the module.

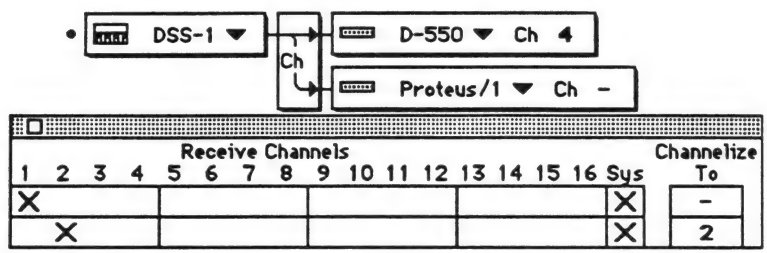



**Channel Splitter Module Editing Window**

Each line in the window controls which channels in the MIDI data stream are passed through to the corresponding splitter output. A checked channel passes data, an unchecked channel doesn't. "Sys" includes all MIDI System messages—system exclusive, MIDI Time Code, song select, tune request, clock, and system reset. The **Channelize To** numerical lets you change all the events passed to an output to the same MIDI channel. "–" means that the data is passed through without having its channel changed.

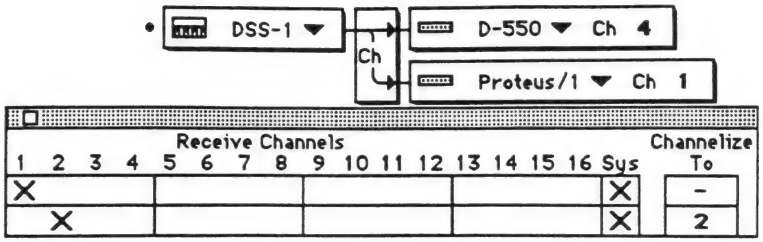
In Example A (the following illustration), MIDI data that is received on MIDI Channel 1 will play Channel 4 of the D-550. MIDI data received on Channel 2 will play Channel 2 of the Proteus/1.

Follow through Example A. As illustrated, the top Channel Splitter module input receives data on MIDI Channel 1. It is not channelized, so it exits the Channel Splitter module on MIDI Channel 1. Data is changed to MIDI Channel 4, however, by the D-550 MIDI Destination module, meaning that data will be received by Channel 4 of the D-550. The bottom half of the Channel Splitter module receives data on MIDI Channel 2 and channelizes it to MIDI Channel 2. The Proteus/1 MIDI Destination module is set to Channel "-", meaning that data received at its input is not re-channelized. Therefore, the Proteus/1 will receive data on MIDI Channel 2.




**Example A**

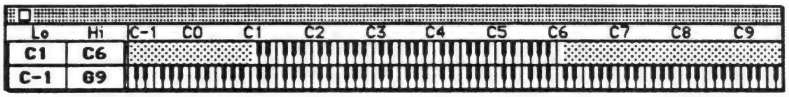
As an additional exercise, look at Example B. The top half of the connection hasn't changed; the bottom half, however, is different. Notice that data is still received by the Channel Splitter module on Channel 2, channelized to MIDI Channel 2, and sent out the Splitter module. The Proteus/1 MIDI Destination module is now set to MIDI Channel 1. This means that data is being re-channelized to MIDI Channel 1 after leaving the Channel Splitter module. As a result, the Proteus/1 will now receive data on MIDI Channel 1.




**Example B**

## *Note Range Splitter Module*

The Note Range Splitter module limits the range of MIDI notes (and polyphonic aftertouch events) routed to each output of the splitter. To open an editing window, insert a Note Range Splitter module into a connection, then double-click the module.




**Note Range Splitter Module Editing Window**

The editing window contains one line for each of the Splitter's outputs. You can edit each output's note range by using the numericals at the left, or by using the keyboard. When you click the lower half of the keyboard, all notes below the click point will disappear, and the numericals will indicate the new note range. Similarly, clicking high on the keyboard will remove notes above the click point. Clicking and dragging changes the note range as you move the mouse back and forth across the keyboard.

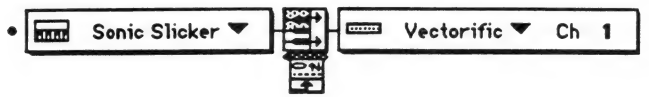
MIDI events other than notes and polyphonic aftertouch pass through to all outputs of the splitter.

Let's assume, for example, that you need your "Sonic Slicker" keyboard to control two different sound modules on MIDI Channel 1—the "Vectorific", which needs to produce the right-hand melody sound, and the "MiniMerk", which needs to produce the left-hand bass sound. Define a connection using the Note Range Splitter module.

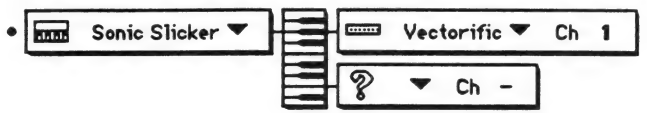
- Create a new patch and define your Source and Destination modules as discussed previously.

- Add a Note Range Splitter module between the MIDI Source and MIDI Destination modules.

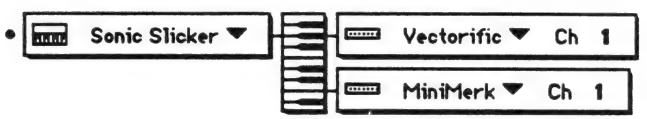
- Click the MIDI Destination module icon and move the cursor below the Note Range Splitter module. The area below the Splitter module will become highlighted.



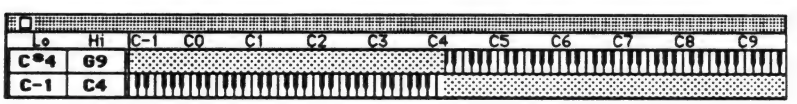

- Click the mouse to add a new, undefined MIDI Destination module.



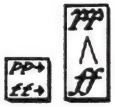

- Select "MiniMerk" from the MIDI Destination module's pop-up menu.
- Select MIDI Channel 1 from the MiniMerk MIDI Destination module's Channel numerical.



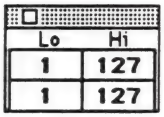

- Double-click the Note Range Splitter module and enter note ranges for each Splitter module output.




As shown here, all notes from C#4 to G9 will be played by the upper MIDI Destination module (the Vectorific) and all notes from C-1 to C4 will be played by the bottom MIDI Destination module (the MiniMerk ).



The Velocity Splitter module allows notes with only specific ranges of note-on key velocities to pass through to each output of the Splitter module. To open an editing window, insert a Velocity Splitter module into a connection, then double-click the module.




**Velocity Splitter Module Editing Window**

Like the Channel and Note Range Splitter modules, each line corresponds to one output of the splitter. Only notes with velocities within the specified range will pass through to the Splitter module's output.

MIDI events other than notes are passed through to all outputs of the splitter.

***NOTE:*** *Some notes may be cut off early when transposing the outputs of a velocity splitter and playing chords.*

## Transposer Module

The Transposer module transposes note and polyphonic aftertouch events. To open an editing window, insert a Transposer module into a connection, then double-click the module.

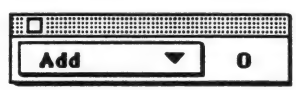
**Transposer Editing Window**

The transposition interval is expressed musically, not as a number of half-steps. If you prefer thinking in terms of half-steps, type the number of half steps into the numerical, then hit the Return or Enter keys. Negative values transpose downward; positive values upward. The following chart shows the relationship between intervals and half-step values:

| | | |
|---|---|---|
| m2 | minor second | 1 half-step |
| M2 | major second | 2 half-steps |
| m3 | minor third | 3 half-steps |
| M3 | major third | 4 half-steps |
| P4 | perfect fourth | 5 half-steps |
| #4 | sharp fourth (tritone) | 6 half-steps |
| P5 | perfect fifth | 7 half-steps |
| m6 | minor sixth | 8 half-steps |
| M6 | major sixth | 9 half-steps |
| m7 | minor seventh | 10 half-steps |
| M7 | major seventh | 11 half-steps |
| +1 oct | up one octave | 12 half-steps |

## Modifier Modules

Use Modifier modules to alter note-on velocities, mono aftertouch, poly aftertouch, and MIDI control values. To open an editing window for one of the four Modifier modules, insert it into a connection, then double-click the module.




**Modifier Module Editing Window**

All Modifier module's editing windows have a pop-up menu of modifiers. The choices are **Add**, **Scale**, **Max Limit**, **Min Limit**, **Set To**, and **Filter Out**. The amount of the operation is set by the numerical to the right. If you are not familiar with numericals, read "Appendix A: Working with Opcode Applications".

**Add** will add the specified number to each MIDI data value. Positive and negative values may be used. **Scale** will scale the value by the specified percentage: 100% is unchanged, 50% halves each value, 199% (the maximum) nearly doubles each value (you cannot have values greater than 127 or less than 0, however). **Max Limit** reduces all values higher than the specified value down to the limit you enter. Similarly, **Min Limit** increases all values lower than the specified value up to the limit you enter. **Set To** changes all values to the one you enter. **Filter Out**, which is not allowed for velocity, removes the event type completely.

### *Velocity Modifier*

Double-click the Velocity Modifier module to open its editing window. Velocity will be modified according to the pop-up menu selection and the numerical value.

### *Aftertouch Modifier*

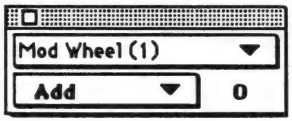
Double-click the Aftertouch Modifier module to open its editing window. Mono Aftertouch will be modified according to the pop-up menu selection and the numerical value.

### *Poly Aftertouch Modifier*

Double-click the Polyphonic Aftertouch Modifier module to open its editing window. Poly Aftertouch will be modified according to the pop-up menu selection and the numerical value.

### *Control Value Modifier*

Double-click the Control Value Modifier to open its editing window. This window contains an additional pop-up menu for choosing which MIDI continuous control value to modify.

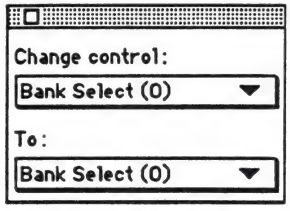



**Control Value Modifier Module Editing Window**

The Control Value Modifier module contains a small number in its lower right corner. This indicates the number of the controller being modified.

## Control Number Mapper Module

The Control Number Mapper module changes one type of MIDI control message into another. To open an editing window for the Control Number Mapper module, insert it into a connection, then double-click the module.

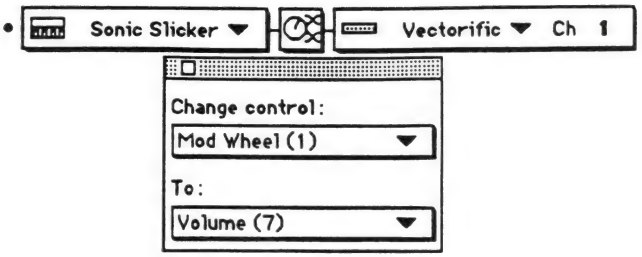



**Control Number Mapper Module Editing Window**

The Control Number Mapper Module's editing window contains two pop-up menus. Choose the old control number from the top pop-up menu. Use the bottom pop-up menu to choose the new control number.

Let's say, for example, that you wanted to play your "Vectorific" sound module from your "Sonic Slicker" keyboard, and that you wanted to control the Vectorific's volume with the Sonic Slicker's modulation wheel.

- Create a connection with the Sonic Slicker as the MIDI source and the Vectorific as the MIDI destination.
- Insert the Control Number Mapper module into the connection, then double-click it to open its editing window.
- Choose Mod Wheel (1) from the upper pop-up menu.
- Choose Volume (7) from the lower pop-up menu.




The Sonic Slicker's modulation wheel now controls the Vectorific's output volume.

## VIRTUAL CONTROLLERS AND VIRTUAL INSTRUMENTS

Virtual Controllers and Virtual Instruments are extremely powerful features of OMS patches. They're enhanced versions of the MIDI devices defined in your current Studio Setup document. Any number of Virtual Controllers and Virtual Instruments can be stored within a Patch document.

A Virtual Controller is the output of a MIDI device plus some form of MIDI processing. A Virtual Controller is treated the same as any other MIDI controller defined in your current Studio Setup document, except that it enhances the performance of a MIDI controller by adding MIDI processing. Virtual Controllers have two important uses:

1) They are used when common MIDI processing connections need to be used in multiple OMS patches.

2) They are used as sequencer inputs when you need to record a MIDI controller with some processing applied.

A Virtual Instrument is some form of MIDI processing routed to one or more MIDI devices. A Virtual Instrument is treated the same as any other MIDI destination defined in your current Studio Setup document, except that it enhances performance by stacking, splitting or layering various devices and adding MIDI processing. Virtual Instruments have two important uses:

1) They are used when common MIDI processing connections need to be used in multiple OMS patches.

2) They are used as sequencer destination instruments—allowing the sequenced tracks to play into a MIDI processing stream.

***NOTE:*** *MIDI data can sometimes get very dense when working with Virtual Controllers and Virtual Instruments. Therefore, when designing your patches, it's a good idea to always use Event Type Filter Modules to remove any unnecessary data.*

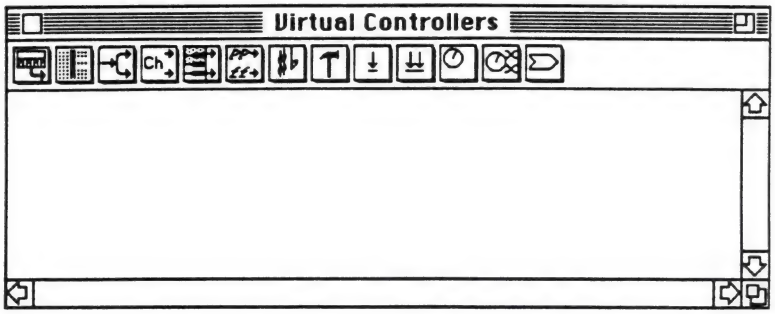
Virtual Controllers and Virtual Instruments can be difficult to understand at first. The following sections will illustrate why you may wish to use Virtual Instruments and Virtual Controllers, how to set them up, and how to use them within Vision.

## Using Virtual Controllers

A Virtual Controller is the output of a MIDI device *plus* some form of MIDI processing. Let's look at an example of a Virtual Controller.

Let's say that your new "Gizmatronics" keyboard is too sensitive to aftertouch. Pushing just slightly on the keys causes the Gizmatronics to send very high aftertouch values. With the Studio 5, you could design a Virtual Controller that processes the aftertouch data *before* sending it to your sequencer or MIDI devices.

- Click the **Virtual Controllers** button in the Patch document window, or choose **Edit Virtual Controllers** from the **Patch** menu to open a Virtual Controllers editing window. A Virtual Controllers editing window is very similar to the patch editing window.




**Blank Virtual Controllers Editing Window**

- Click the MIDI Source module icon. The cursor will turn into the MIDI Source icon. Click anywhere in the space below the Module Palette to create an undefined connection.

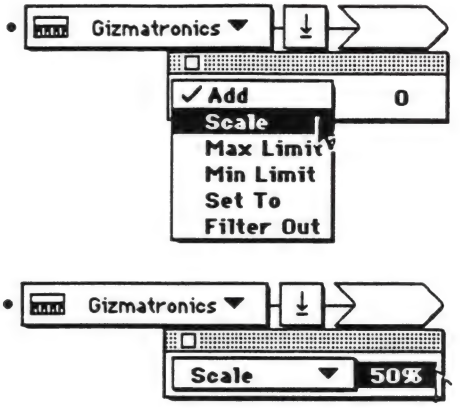
Notice that this connection looks very similar to an undefined patch connection; the only difference is that the MIDI Destination module is replaced by a Virtual Controller module.

- Choose "Gizmatronics" from the MIDI Source module's pop-up menu.

- Insert a Mono Aftertouch Modifier module between the MIDI Source module and the Virtual Controller module.

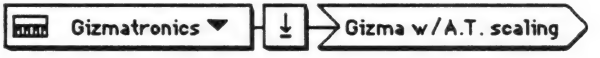
- Double-click the Mono Aftertouch Modifier module to open its editing window.
- Choose **Scale** from the Modifier module's pop-up window and enter a value of **50%** into the Modifier module's numerical.

This will scale the Gizmatronics Mono Aftertouch output by 50%, resulting in the desired decrease in Mono Aftertouch sensitivity.




- Click the Virtual Controller Module. Its border will become thick and it will contain a flashing text-insertion cursor.

- Type a suitable name for your new Virtual Controller.




- Close the Virtual Controller editing window.

If you open a patch in the patch editing window, you'll see that "Gizma w/A.T. scaling" has been added to your list of possible MIDI sources. Now, instead of using the Gizmatronics as a controller, you can use the improved Virtual Controller as your MIDI source.

The previous example provided a graphic illustration of the Virtual Controller definition—Virtual Controllers are the output of a MIDI device *plus* some form of MIDI processing.

Virtual Controllers are edited similarly to patches, except that instead of MIDI Destination Modules, there are Virtual Controller Modules.

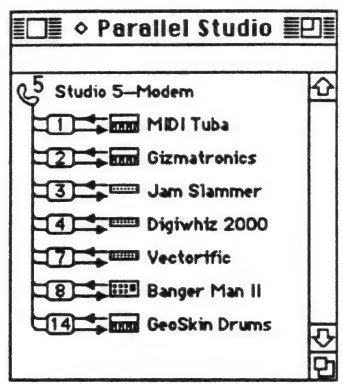
All of the modules and connections to the left of the Virtual Controller Module are used to define the output of that Virtual Controller. There may be any number of Virtual Controllers for each real controller.

Virtual Controllers appear in the pop-up MIDI source menus when you edit a patch. If you choose a Virtual Controller, it has the same appearance in the patch editing window as in the Virtual Controller editing window, except that you can't edit its name.

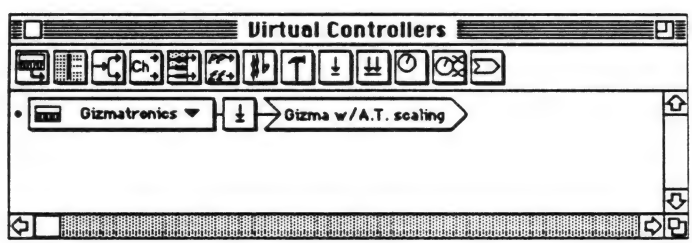
### *Using Virtual Controllers within Vision*

OMS applications such as Vision and Studio Vision (versions 1.3 or later) treat Virtual Controllers as they would any other MIDI input device.

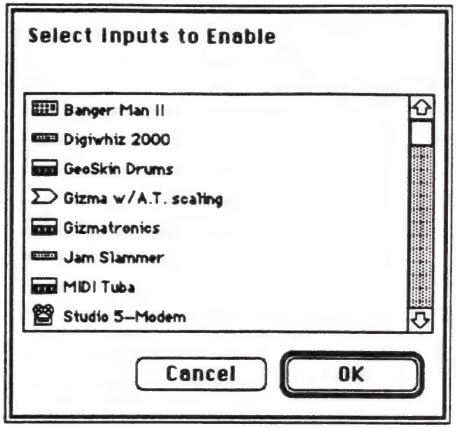
Let's look at an example of using Virtual Controllers with Vision. Assume that your Studio Setup document looks as follows,




and that you have defined a Virtual Controller like the one shown, below.

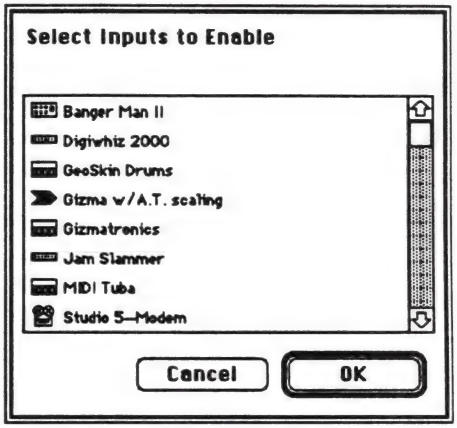


- Launch Vision.
- Choose **Enable Input Devices** from Vision's **Setups** menu. You'll see a dialog box listing all possible MIDI Input devices, including any Virtual Controllers, as defined by the current OMS Patch document.




**Vision's "Enable Input Device" Dialog Box**

Notice, in this example, that the Virtual Controller named "Gizma w/A.T. scaling" is available as a MIDI input source. You enable input devices by clicking them, which will also highlight them. In the following example, "Gizma w/A.T. scaling" is highlighted and, therefore, is enabled as an input device.



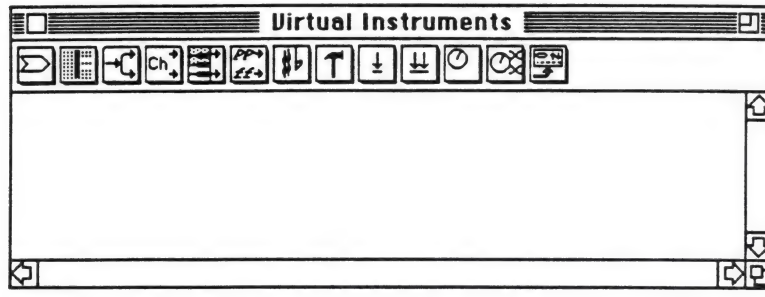

By using our specially designed "Gizma w/A.T.scaling" Virtual Controller as an input device, you can record data with satisfactory aftertouch values directly into Vision.

## Virtual Instruments

A Virtual Instrument is made up of one or more MIDI destinations *plus* some form of MIDI processing. Virtual Instruments are basically the opposite of Virtual Controllers.

Let's say that it's common for you to "stack" instruments together to get a really big MIDI sound—particularly the new "Jam Slammer" and "Digiwhiz 2000" sound modules playing on MIDI Channel 2. Using Virtual Instruments, you can create that stack and always have it available as a MIDI destination.

- Click the **Virtual Instruments** button in the Patch document window, or choose **Edit Virtual Instruments** from the **Patch** menu to open a Virtual Instruments editing window. A Virtual Instruments editing window is very similar to the patch editing window.




**Blank Virtual Instruments Editing Window**

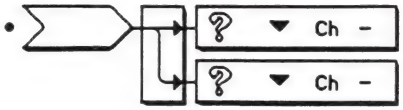
- Click the Virtual Instrument module icon.

- Click in the blank space below the Module Palette to create an undefined Virtual Instrument connection.

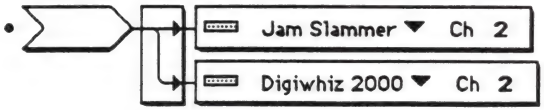
Notice that this connection looks very similar to an undefined patch connection; the only difference is that the MIDI Source module is replaced by a Virtual Instrument module.

- Insert a Simple Splitter module between the Virtual Instrument and the MIDI Destination modules.

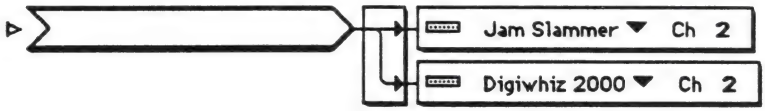
- Add a second MIDI Destination module by clicking its icon and inserting it below the Simple Splitter module.



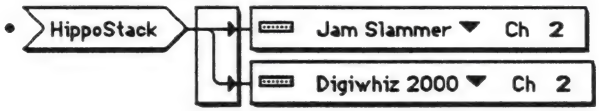

- Choose the Jam Slammer from the upper MIDI Destination module's pop-up window, and the Digiwhiz 2000 from the lower MIDI Destination module's pop-up window. Set their MIDI channels to Channel 2.




- Click the Virtual Instrument module to select it.




- Type in the name of your new Virtual Instrument.




- Close the Virtual Instrument editing window.

If you open a patch in the patch editing window, you'll see that "HippoStack" has been added to your list of MIDI destinations. Whenever you want to play a stack made up of the Jam Slammer and Digiwhiz 2000 synthesizers on MIDI Channel 2, simply choose this Virtual Instrument as the MIDI Destination.

The previous example provided a graphic illustration of the Virtual Instrument definition—Virtual Instruments are made up of one or more MIDI destinations *plus* some form of MIDI processing.

Like Virtual Controllers, Virtual Instruments are edited similarly to patches with only minor exceptions. The Virtual Instrument editing window contains connections from Virtual Instruments to devices.

Instead of MIDI Source modules, there are Virtual Instrument modules:

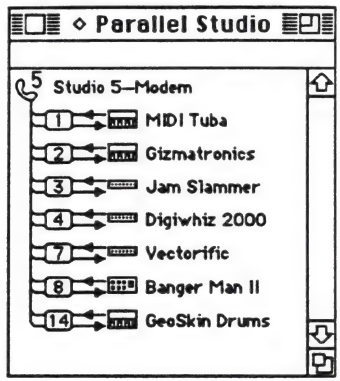
Virtual Instruments appear in the pop-up MIDI destination menus when you edit a patch. If you choose a Virtual Instrument, it has the same appearance in the patch window as in the Virtual Instrument editing window, except that you can't edit its name.

***NOTE:*** *System Exclusive messages should always be sent directly to the intended device. Sending System Exclusive to a Virtual Instrument containing a Splitter module and different devices thickens the MIDI data stream unnecessarily. Sending System Exclusive to a Virtual Instrument consisting of a Splitter module routed to different channels of the same device will corrupt the data.*

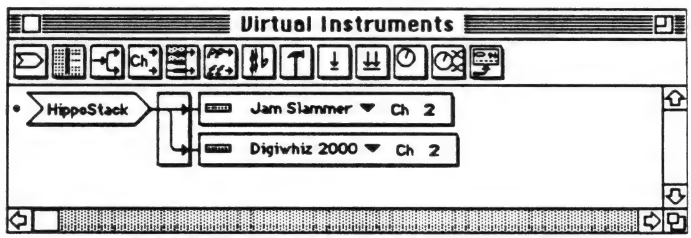
### *Using Virtual Instruments within Vision*

OMS applications such as Vision and Studio Vision (versions 1.3 or later) treat Virtual Instruments as they would any other MIDI destination device.

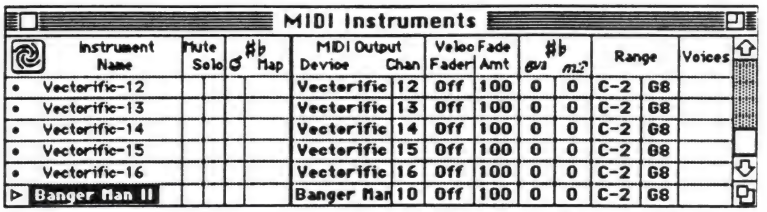
Let's look at an example of using Virtual Instruments with Vision. Assume that your Studio Setup document looks as follows,




and that you have defined a Virtual Instrument like the one shown, as follows.

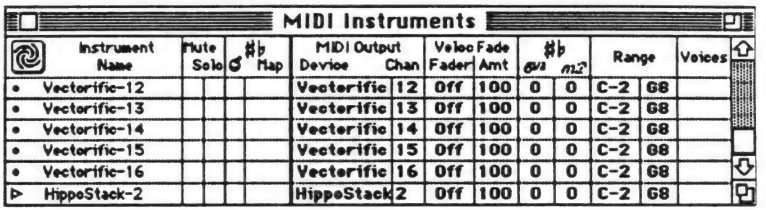


- Launch Vision.
- Choose **Instruments** from Vision's **Setups** menu.
- Choose **New Instrument** from the **Instruments** menu. A new Instrument will be added to the MIDI Instruments list.

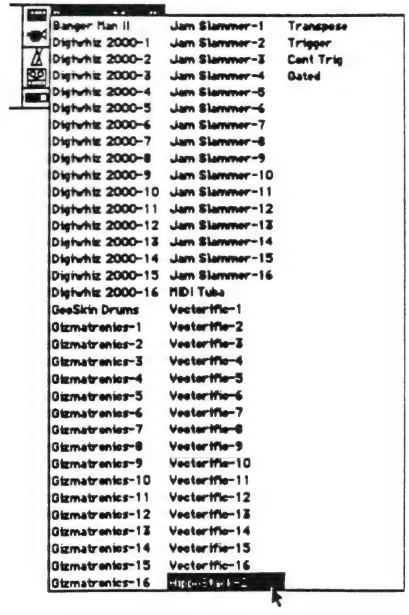

MIDI Instruments
Instrument Name
Mute Solo
Map
MIDI Output Device
Chan
Veloc Fader
Fade Amt
gva
Range
Voices
• Vectorific-12 Vectorific 12 Off 100 0 0 C-2 G8
• Vectorific-13 Vectorific 13 Off 100 0 0 C-2 G8
• Vectorific-14 Vectorific 14 Off 100 0 0 C-2 G8
• Vectorific-15 Vectorific 15 Off 100 0 0 C-2 G8
• Vectorific-16 Vectorific 16 Off 100 0 0 C-2 G8
▷ Banger Man II Banger Man 10 Off 100 0 0 C-2 G8

- Choose "HippoStack" from the MIDI Output Device pop-up menu. This menu displays all MIDI destinations as defined in your current Studio Setup document as well as the Virtual Instruments in your current OMS Patch document.
- Choose Channel 2 from the MIDI Output Channel pop-up menu (since "HippoStack" was designed to play on MIDI Channel 2).

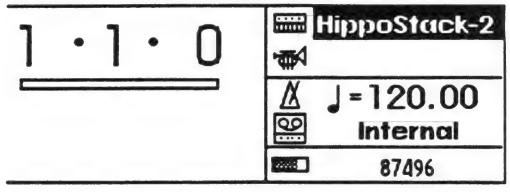
The MIDI Instrument's name becomes "HippoStack-2", indicating that it uses the Virtual Instrument named "HippoStack", and that it is set to receive on MIDI Channel 2. You can keep this name or type another.


MIDI Instruments
Instrument Name
Mute Solo
Map
MIDI Output Device
Chan
Veloc Fader
Fade Amt
gva
Range
Voices
• Vectorific-12 Vectorific 12 Off 100 0 0 C-2 G8
• Vectorific-13 Vectorific 13 Off 100 0 0 C-2 G8
• Vectorific-14 Vectorific 14 Off 100 0 0 C-2 G8
• Vectorific-15 Vectorific 15 Off 100 0 0 C-2 G8
• Vectorific-16 Vectorific 16 Off 100 0 0 C-2 G8
▷ HippoStack-2 HippoStack 2 Off 100 0 0 C-2 G8

- Click the Thru Instrument setting in the upper right corner of Vision's Control bar (the little trumpet). You'll see a pop-up menu of MIDI Instruments as defined in Vision's Instruments window.




- Choose "HippoStack-2".



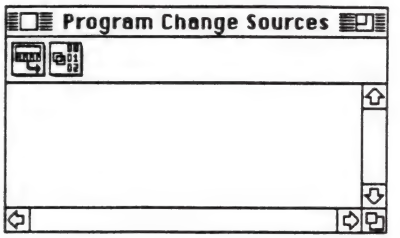

The Thru Instrument will now play the Virtual Instrument named "HippoStack", which is the combined sound of the "Jam Slammer" and "Digiwhiz 2000" sound modules on MIDI Channel 2.

Virtual Instruments can be used to define any number of MIDI Instruments within Vision. You can choose instruments within any of Vision's MIDI Instrument pop-up menus (as found in the Sequence window, List window, Graphic window, and so on).

## PROGRAM CHANGE SOURCES

The Program Change Sources window specifies how a program change, sent from a MIDI controller, will change the current OMS patch. This makes it convenient to change OMS patches from your master controller when you're working within other MIDI applications. You don't have to activate the current Patch document window or reach over to the Studio 5 to change OMS patches. A Patch document can contain any number of Program Change Sources.

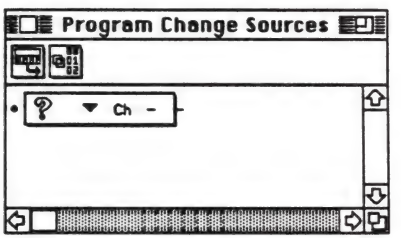
- Click the **Program Change Sources** button in the Patch document window, or choose **Edit Program Change Sources** from the **Patch** menu to open the Program Change Sources editing window.




**Blank Program Change Sources Editing Window**

The Program Change Sources editing window is similar to a patch editing window except that there are only two modules in the module palette—the MIDI Source module icon and the Program Change Source module icon. Editing techniques are similar to those you use in patch editing windows.

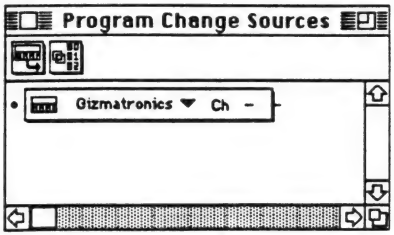
- Click the MIDI Source module icon. The cursor will resemble a MIDI Source module.
- Click in the space below the module palette to create an undefined Program Change connection.



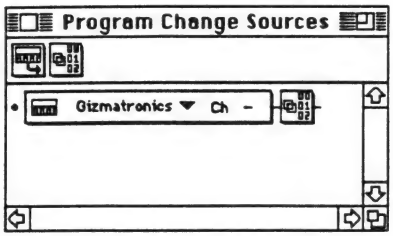

The MIDI Source module is slightly different from a patch editing window's MIDI Source module; this module contains a MIDI Channel numerical.

Use the MIDI Channel numerical to set the MIDI Channel that the Program Change command must come from. A dash ("-") means that the program change can come from any channel.

- Choose a MIDI source from the MIDI Source module's pop-up menu. This will become the source of remote OMS patch changes.




- Place a Change OMS Programs module to the right of the MIDI Source module using techniques discussed previously.




The previous example will send patch changes from the "Gizmatronics" to OMS.

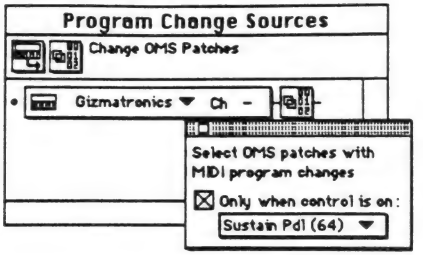
Often times, you may wish to change patches on your MIDI controller *without* having the OMS patch changed. You would, in these instances, make full use of the Change OMS Patches module, described in the next section.

## Change OMS Patches

A Change OMS Patches module must be connected to the output of a MIDI Source module to enable the chosen MIDI source to send program changes to OMS.

- Double-click on the Change OMS Patches module to open its editing window.

This editing window specifies whether or not MIDI program changes require a particular MIDI controller (typically a footswitch or button) to be "on" before the program change is actually sent. Checking the box activates this feature. Use the pop-up menu to specify which MIDI controller message needs to be "on" in order to enable OMS program changes. The controller data must come from the device selected in the MIDI Source module.




In the previous illustration, the Gizmatronics will change the OMS patch *only* if the Gizmatronics' sustain pedal is down. Patch changes on the Gizmatronics will not affect OMS patch selection if the sustain pedal is not used.

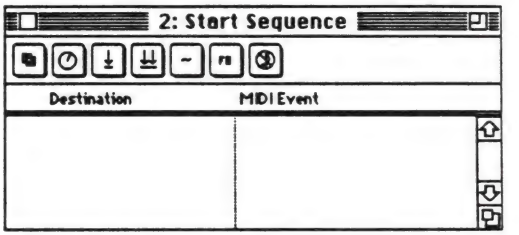
## PATCH SEQUENCES

Each OMS patch can contain a pair of sequences—the Start Sequence and the End Sequence. A patch's Start Sequence is a short list of MIDI events sent to various devices when the patch is recalled. The patch's End Sequence is a short list of events sent when a different patch is called up.

Start Sequences are very useful for sending program changes, system exclusive patch data, initial controller values, or note off commands to a device when a patch is selected. End Sequences are often used, when leaving a patch, to undo the effects of the start sequence.

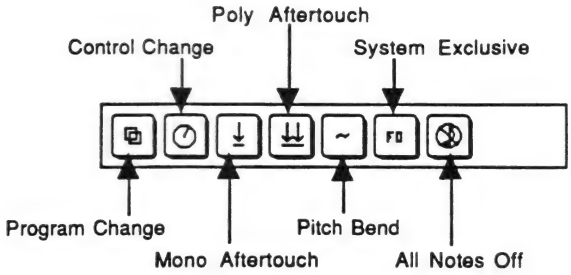
***NOTE:*** *Sequence events are sent one immediately after another. They do not contain timing information.*

- Choose **Edit Patch Start Sequence** or **Edit Patch End Sequence** from the **Patch** menu. The sequence editing window opens.



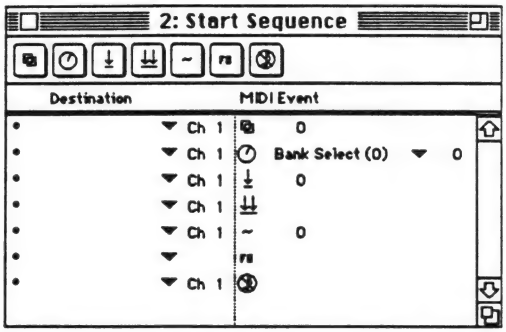

**Empty Start Sequence Window**

The seven buttons represent different MIDI events. These are, from left to right: Program Change, Control Change, Mono Aftertouch, Poly Aftertouch, Pitch Bend, System Exclusive, and All Notes Off.




***NOTE:*** *The All Notes Off feature does not use the MIDI All Notes Off message, since this is not implemented in all MIDI devices. Rather, when the sequence is triggered, the All Notes Off feature sends actual note off commands to all 128 MIDI notes on the specified channel. This is useful for preventing stuck notes when changing patches.*

- Click each button and an undefined corresponding event will appear in the space below the Module Palette.




**Undefined Events in Start Sequence Window**

Choose MIDI destinations and MIDI control numbers from pop-up menus. Select MIDI channels and event values by their corresponding numericals.

MIDI program change events are numbered 0-127.

To edit a System Exclusive event, click in the area to the right of the "F0" icon and an editing window opens. Type in hexadecimal data and close the window.

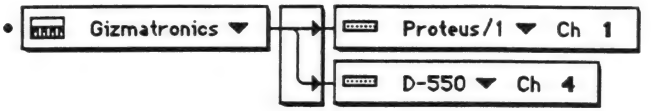
***NOTE:*** *System Exclusive data can be pasted from the Macintosh's Clipboard. If you have a large string of System Exclusive data (like a patch dump), it can be copied to the Clipboard from within Vision (or Studio Vision) and then pasted into the patch sequence's System Exclusive event field.*

*NOTE: System Exclusive messages in a Start or End Sequence should always be sent directly to the intended device. Sending SysEx to a virtual instrument containing a splitter module and different devices thickens the MIDI data stream unnecessarily. Sending SysEx to a virtual instrument consisting of a splitter module routed to different channels of the same device will corrupt the data.*

Clicking a sequence event's selector dot selects that event. Shift-clicking sequence events will select more than one event for cutting, copying, or clearing. Sequence events can be rearranged by option-clicking their selector dots and dragging them to new locations.

Let's assume, for example, that you're performing in a live situation and need to define OMS Patch #2 as a MIDI "stack" that combines a modulated vibe sound from the Proteus/1 with a soft organ sound from the D-550.

- Define the patch using the techniques discussed previously in this chapter.

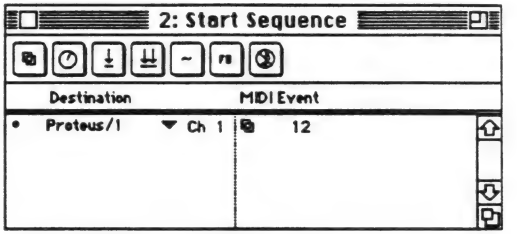



You must now define a Start Sequence that sets the Proteus/1 and D-550 to the proper sounds, volumes and modulations.

- Choose **Edit Patch Start Sequence** from the **Patch** menu. An empty Start Sequence window will open.

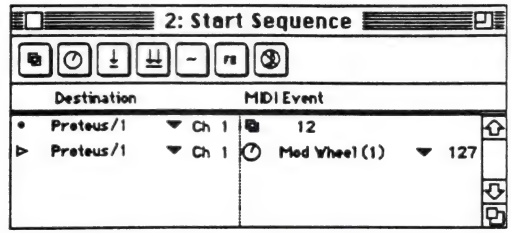
Assume that the Proteus/1 has Patch #12 defined as a Vibe sound.

- Click the **Program Change** button in the Module Palette and choose the Proteus/1 as the destination and Patch #12 as the program change number.



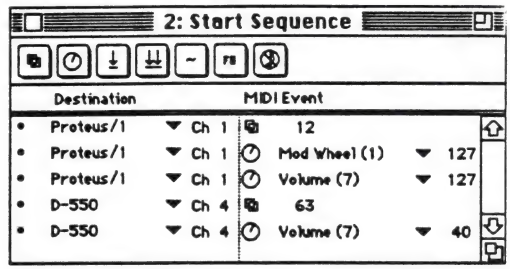

- Click the **Control Change** button, choose the Proteus/1 as the destination, the Mod Wheel as the MIDI Event and a value of 127.

This sets the vibe sound's modulation to full value.




- Choose the desired organ patch for the D-550 and set each synthesizer's volume level using MIDI Volume Control.

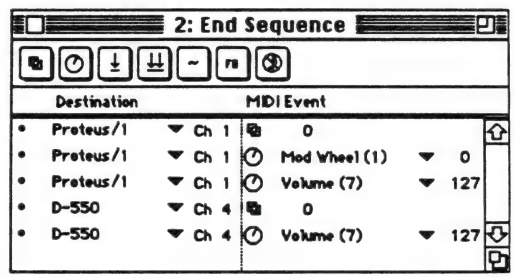
The final start sequence would look as follows:


2: Start Sequence
Destination
MIDI Event
Proteus/1 Ch 1 12
Proteus/1 Ch 1 Mod Wheel (1) 127
Proteus/1 Ch 1 Volume (7) 127
D-550 Ch 4 63
D-550 Ch 4 Volume (7) 40

Now, whenever you recall OMS Patch #2, your "Gizmatronics" keyboard will control a stack that combines the Proteus/1 (Channel 1, Patch #12 with full modulation and volume) with the D-550 (Channel 4, Patch #63 and a MIDI volume level of 40).

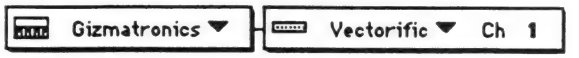
- Create an End Sequence to undo the settings of the Start Sequence.

The End Sequence will play whenever a patch other than OMS Patch #2 is recalled. The End Sequence shown below will reset the Proteus/1 and D-550 to Patch #0, their volumes to 127, and the Proteus/1's Mod Wheel value to 0 whenever a different OMS patch is selected.

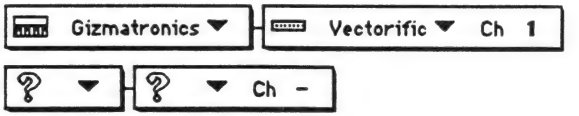

2: End Sequence
Destination
MIDI Event
Proteus/1 Ch 1 0
Proteus/1 Ch 1 Mod Wheel (1) 0
Proteus/1 Ch 1 Volume (7) 127
D-550 Ch 4 0
D-550 Ch 4 Volume (7) 127

An individual patch can contain more than one MIDI routing. As an example, let's say that you (operating your "Gizmatronics" master keyboard controller) and your drummer (playing his new "GeoSkin" MIDI percussion pads) both want to control the same "Vectorific" sound module patch from your individual controllers. This is a classic example of MIDI merging.

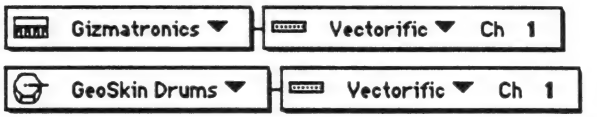
- Choose **New Patch** from the **Patch** menu and create an OMS patch with the Gizmatronics as the MIDI source and the Vectorific module as the MIDI destination.




- Click the MIDI Source module icon and create a second connection below the first.

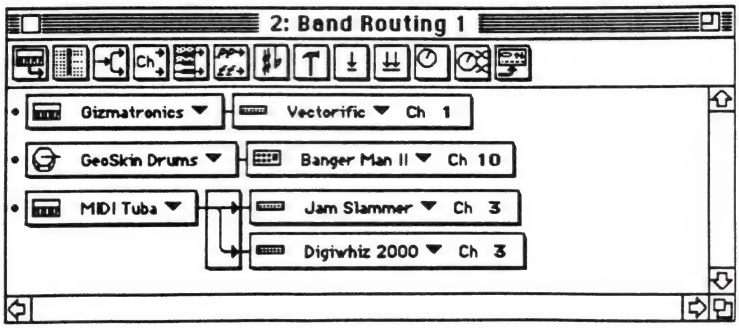



- Choose the GeoSkin drums as the MIDI source and the Vectorific as the MIDI destination.




With this patch, both the Gizmatronics keyboard and the GeoSkin drums will play MIDI Channel 1 of the Vectorific module.

You can route your entire band through the Studio 5. For instance, you could have the Gizmatronics playing the Vectorific, the GeoSkins playing the Banger Man II drum module and the MIDI Tuba playing a Jam Slammer/Digiwhiz 2000 stack. This configuration would have a patch window similar to the one shown below:



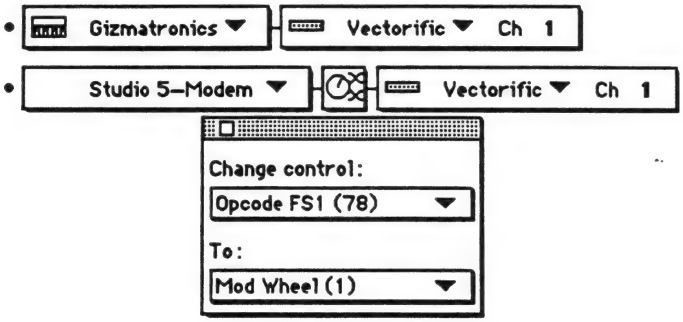

**Multiple Connections in a Patch**

## USING STUDIO 5 FOOTSWITCHES IN PATCHES

The Studio 5's two footswitches (FS1, FS2) and one foot controller (FC1) can be used as controllers in an OMS patch. To use the footswitches or foot controller in a patch, simply choose the Studio 5 as your MIDI source.

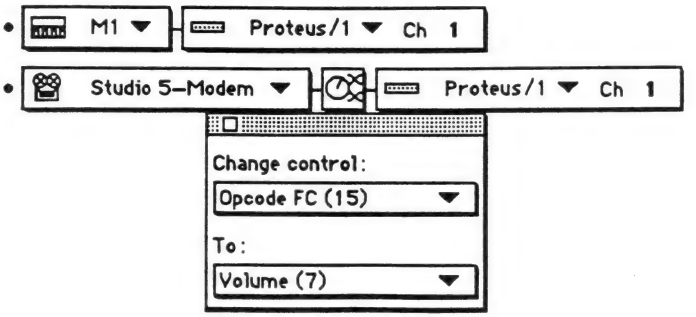
As an example, let's say you want your "Gizmatronics" keyboard to play a sound on your "Vectorific" sound module. You also want to apply full modulation at the touch of a footswitch. To do so, you set up a patch that merges the Gizmatronics MIDI data with one of the Studio 5's footswitches.

In the example shown below, the Studio 5 is selected as the second MIDI source and its footswitch (FS1) is re-mapped to control the Modulation Wheel.



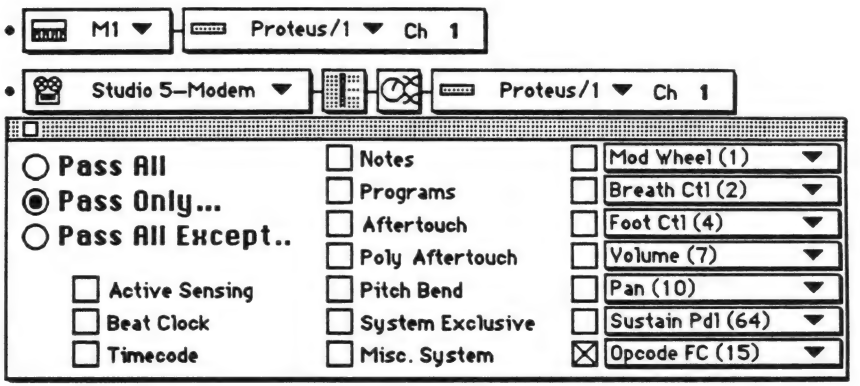

Now, whenever you step on FS1, the "Vectorific" will have full modulation applied (as if you had turned the mod wheel all the way up on your Gizmatronics). When you release the FS1 pedal, the Vectorific sound will play without any modulation.

A simple volume pedal is created in the following example. The M1 controls MIDI Channel 1 of the Proteus/1. The foot controller (FC1) controls the volume of the Proteus/1.



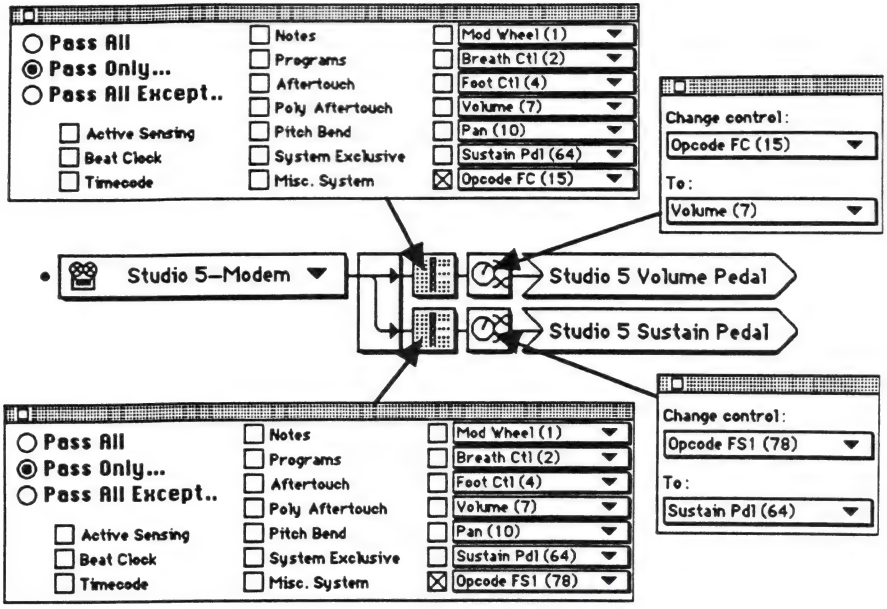

***NOTE:*** *You must make certain that* ***Foot Controller In*** *in the* ***Studio 5*** *menu is checked in order for Foot Controller information to be recognized. Foot Controller status is saved within the Studio 5's internal memory.*

You can improve upon the above example by adding an Event Type Filter module. Use the filter to pass only Opcode foot controller data from the Studio 5 to the Proteus/1 as shown below. This prevents MIDI Time Code, if it's in use, from being sent to your Proteus.

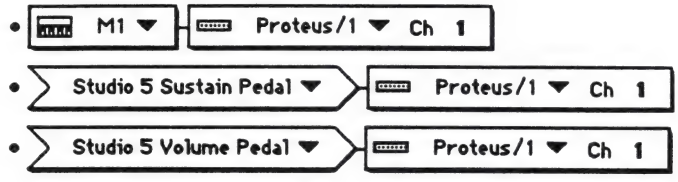



As another example, let's say you want to use the Studio 5 foot controller (FC1) as a volume pedal, and a Studio 5 footswitch (FS1) as a sustain pedal. Using Virtual Controllers is the easiest and most efficient way to handle this task.

- Choose **Edit Virtual Controllers** from the **Patch** menu or click the **Virtual Controllers** Button in the current Patch document window to open the Virtual Controllers editing window.
- Design a Virtual Controller similar to the one shown, below. See the "Virtual Controllers and Virtual Instruments" section earlier in this chapter.




You can now use these Virtual Controllers in any patch, without worrying if they are sending MIDI Time Code to your MIDI output devices. The following example illustrates the use of these Virtual Controllers in a patch where the M1 plays Channel 1 of the Proteus/1, while the Studio 5's foot controller controls Proteus volume and the Studio 5's FS1 acts as a sustain pedal.



# 5 Using the Studio 5 with Non-OMS MIDI Software

This chapter discusses using the Studio 5 with non-OMS MIDI Software. If you will *always* be using the Studio 5 with OMS applications (such as Vision, Studio Vision, Galaxy, Max, and Track Chart), you will not need the Compatibility Setup window and may skip ahead to Chapter 6. If you plan to use the Studio 5 *mainly* with OMS applications, you may still wish to skip ahead to Chapter 6, returning to this section when you're ready to use a non-OMS MIDI application. If you will be using mostly non-OMS MIDI applications, read this section now.

The Studio 5 always requires OMS for its configuration, but it can be used with non-OMS MIDI software in one of two ways:

- via MIDI Manager.
- in Compatibility Mode

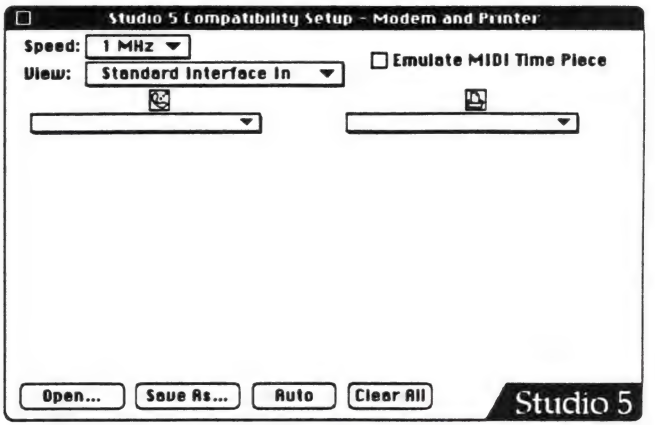
If you'll be using the Studio 5 with MIDI Manager, you should consult your OMS manual. There, you'll learn how to configure the OMS MIDI Manager Driver and how to connect MIDI Manager ports to Studio 5 devices, Virtual Controllers and Virtual Instruments.

If you're not using OMS or MIDI Manager, you must use Compatibility Mode. This mode configures the Studio 5 to emulate either a standard MIDI interface or a MIDI Time Piece (MTP).

When the Studio 5 is turned on, it acts like a standard interface as defined by the current compatibility setup. When OMS is active, the Studio 5 is automatically in "OMS Mode". OMS is active if an OMS application is currently being used, or if OMS is in either "OMS Applications Only" or "Use MIDI Manager" modes (see your OMS manual for details). When OMS becomes inactive, the Studio 5 returns to standard interface mode.

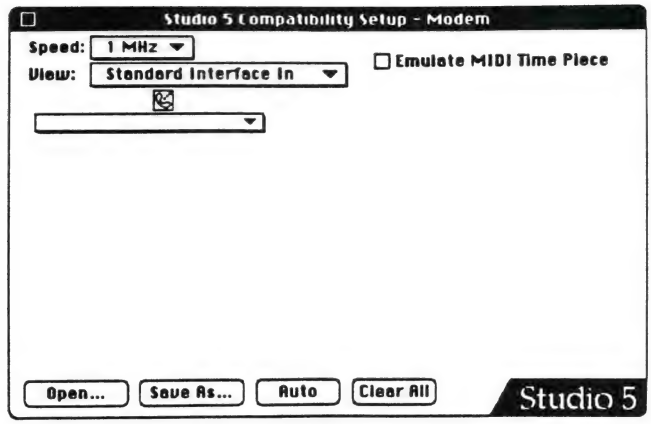
In OMS mode, the Studio 5 operates transparently; applications send to and receive from individual devices. When Performer or some other MTP-aware program becomes active, the program switches the Studio 5 from standard interface emulation into MTP emulation. Similarly, when an MTP-aware program becomes inactive, the program switches the Studio 5 back into standard interface emulation.

To configure the Studio 5 for use in Compatibility Mode, open the "Studio 5/OMS Setup" application and choose **Compatibility Setup** from the **Studio 5** menu. The Compatibility Setup window will open.




**Compatibility Setup Window—"A" and "B" Ports Connected**

The large area in the center of the window contains pop-up menus for choosing devices and connections. The left half of the window controls the Studio 5's "A" port (usually, but not necessarily, connected to the Macintosh Modem port), and the right half of the window controls the Studio 5's "B" port (often, the Macintosh Printer port). If you have both the "A" and "B" ports connected to the Macintosh, you'll see port icons in both halves of the window. If only one Studio 5 port (the "A" port) is connected to the Macintosh, only that port will be displayed as shown below.




**Compatibility Setup Window—"A" Port Only Connected**

*IMPORTANT: If you are using only one Macintosh serial port for MIDI (either Modem or Printer), be certain to connect that port to the Studio 5's "A" port.*

### Speed pop-up menu

This must match the interface speed selected within your non-OMS MIDI applications. Choose **1 MHz** if your MIDI applications don't support FAST mode. 1 MHz is the speed used by most standard MIDI interfaces, such as Opcode's Studio 3. If your application supports a FAST mode and you wish to use it, choose **Fast**. To set the Fast mode speed, choose **Fast Mode Communication Speed** from the **Studio 5** menu and select transfer speeds from the pop-up menus (see the Studio 5 menu section in Chapter 6 for more information on fast speed settings).

### View pop-up menu

The pop-up **View** menu offers a choice of four different views—**Standard Interface In, Standard Interface Out, MIDI Time Piece In,** and **MIDI Time Piece Out**. Selecting a view will change the display in the lower portion of the Compatibility Setup window. This allows you to see and change various aspects of the interface.

### Emulate MIDI Time Piece Checkbox

If **Emulate MIDI Time Piece** is checked, the Studio 5 will emulate Mark of the Unicorn's MIDI Time Piece and all views, except **Standard Interface In** will be enabled. If **Emulate MIDI Time Piece** is not checked, the Studio 5 will emulate a standard MIDI interface and only **Standard Interface In** and **Standard Interface Out** views can be selected.

### Open...

This button will open a standard Macintosh dialog box from which you may open any stored Compatibility Setup document.

### Save As...

This button opens a standard Macintosh "Save As" dialog box for saving Compatibility window settings. Compatibility window settings are stored within the Studio 5/OMS driver document, so you should be sure to save any settings when updating your driver.

### Auto

This button uses the current Studio Setup document to make sensible default assignments for all of the pop-up menus in the current view. The **Auto** button will yield different results depending on which view is active.

*NOTE: The following information is better understood after you've learned to use each of the compatibility views. It's presented here for easy reference.*

For **Standard Interface In**, the **Auto** button enables the controllers and sync sources. If you have both the Modem and Printer ports connected, controllers are routed to the Studio 5's "A" port (usually connected to the Macintosh Modem port), and the sync sources (including the Studio 5's timecode output) are routed to the Studio 5's "B" port. A controller which sends sync will be routed to the Studio 5's "B" port.

For **Standard Interface Out**, the **Auto** button routes each MIDI channel only to devices that receive that channel. Beat clock and timecode are routed only to devices that receive sync. Other system events are routed to all devices. If you have both the Modem and Printer ports connected, data entering the Studio 5's "A" port (usually attached to the Macintosh Modem port) is routed to Studio 5 MIDI ports 1-8 and data entering the "B" port is routed to Studio 5 MIDI ports 9-15.

For **MIDI Time Piece In**, the **Auto** button enables the controllers and sync sources. Controllers will appear to be sent on the MIDI Time Piece cable number that matches the number of the Studio 5 port to which it's connected. If you have both the Modem and Printer ports connected, controllers are routed to the Studio 5's "A" port (usually connected to the Macintosh Modem port), and sync sources are routed to the Studio 5's "B" port.

For **MIDI Time Piece Out**, the **Auto** button routes cable 1 to the device on Studio 5 port 1, cable 2 to the device on Studio 5 port 2, and so on. Sync is routed to all devices that receive sync. "All" is not routed to anything by default, but can be set manually to any device or Virtual Instrument.

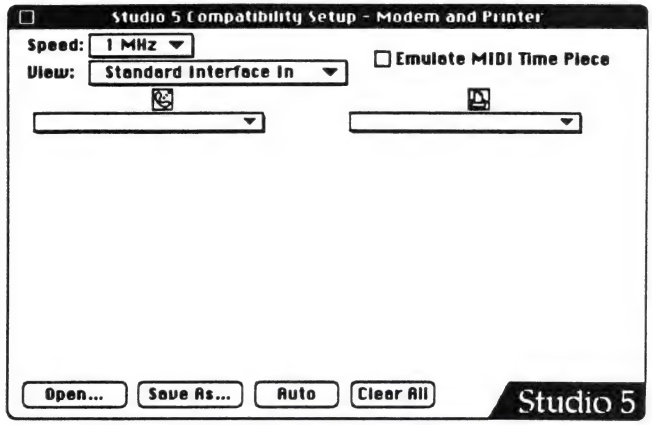
### Clear All

This button clears all port (or cable) selections for the current view.

## THE FOUR COMPATIBILITY VIEWS

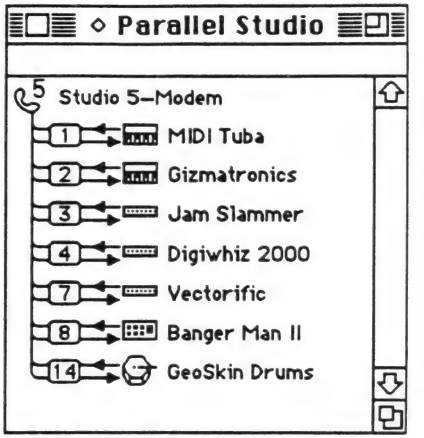
This section examines setup and editing of each of the four possible compatibility views.

### Standard Interface In View

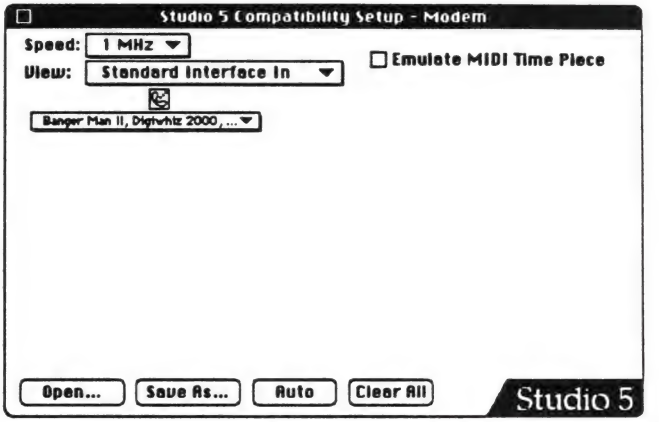



This view enables the Studio 5's inputs when it's emulating a standard MIDI interface. There is one pop-up menu per port. From this menu, you can choose to enable any number of devices and Virtual Controllers. All enabled devices can send data to the Macintosh. Enabled devices have check marks next to their names in the pop-up menu. To enable a device, choose it from the pop-up menu (a check will appear). To disable a device, choose it again (the check will disappear). This view is available only if **Emulate MIDI Time Piece** is not checked.

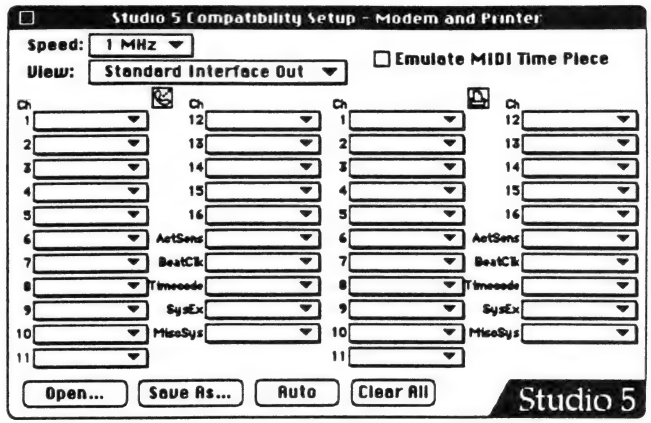
Let's assume, for example, that your current Studio Setup document contains the following devices:




Each device can be enabled for Macintosh input by checking it in the pop-up menu. You could also use the **Auto** button to assign devices automatically according to the rules specified earlier in this chapter.

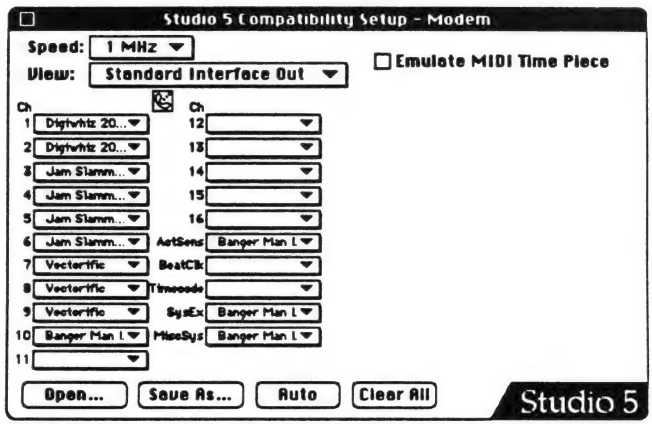


### Standard Interface Out View



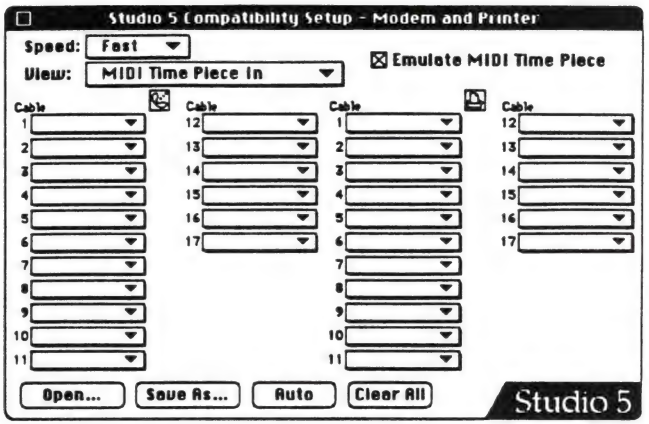

There are 22 pop-up menus per port—one for each of the 16 MIDI channels, plus six others for various non-channel-specific MIDI system events. Choose, from each pop-up menu, any number of devices or Virtual Instruments that need to receive data of the specified type or MIDI channel.

If, for example, your current Studio Setup is the same as that described previously, then you could enable a device (or devices) for each of the 16 MIDI channels as well as for various MIDI system events.



In the previous illustration, the Digiwhiz 2000 will respond to data on channels 1 and 2, the Jam Slammer will play on MIDI Channels 3 through 6, the Vectorific sound module will play on Channels 7 through 9, and the Banger Man II drum module will play on MIDI Channel 10. Also, all devices are enabled for active sensing, system exclusive, and miscellaneous MIDI system messages. Since, in your current Studio Setup document, none of the devices are defined as receiving sync, the Beat Clock and Timecode menus are empty.

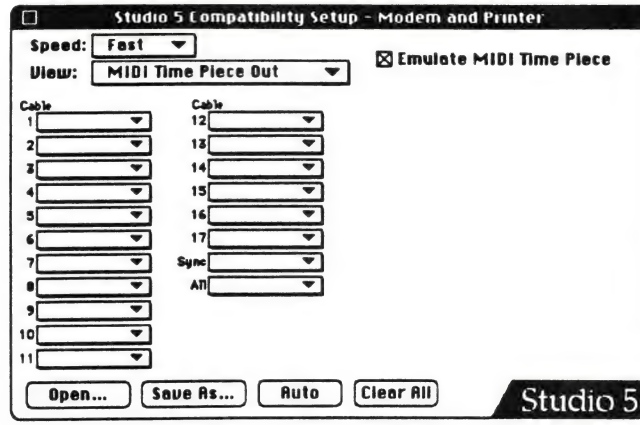
## MIDI Time Piece In View




There are 17 pop-up menus per port—one for each of the 16 possible MIDI Time Piece cables, plus a seventeenth pop-up menu that represents the MIDI Time Piece's Network port. Choose, from each pop-up menu, those devices or Virtual Controllers that will be sent to the Macintosh. The chosen devices or Virtual Controllers will appear to the Macintosh application as having been sent from the MIDI Time Piece cable number next to the menu.

***NOTE:** All enabled controllers in the MIDI Time Piece In view are also enabled when the Studio 5 is in standard interface mode.*

### MIDI Time Piece Out View




There are 19 pop-up menus—including one for each of the 16 possible MIDI Time Piece cables. Choose the device or instrument from a cable's pop-up menu. In addition, there is a pop-up menu that represents the MIDI Time Piece's Network port (cable 17). "Sync" can be sent to any device or devices enabled for sync in the current Studio Setup document. "All" determines which device or Virtual Instrument is controlled by the "All" setting in Performer.

***NOTE:*** *Cable numbers do not necessarily have to correspond to Studio 5 port numbers (although this is the default mode if the* **Auto** *button is used). Each cable can be assigned to any device or Virtual Instrument of your choice.*

#### *Using Output Cables*

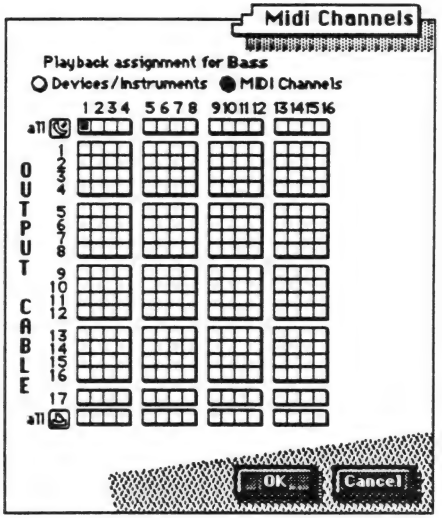
A single Studio 5 emulates two MIDI Time Pieces attached to one port. Within Performer, you can route any track to any MIDI channel and cable (cables 1-17 or "All" cables). Cable numbers have a specific and permanent meaning in the MIDI Time Piece: MIDI Time Piece #1 sends data to cables 1-8, MIDI Time Piece #2 sends data to cables 9-16, cable 17 sends data to an optional standard interface connected to the network port of MIDI Time Piece #2, and "All" sends data to all 17 MIDI Time Piece cables.

The Studio 5 allows these 18 Performer track destinations (cables 1-17 and "All") to become completely flexible. In normal use, you would route cable #1 to Studio 5 port #1, cable #2 to Studio 5 port #2, and so on up to cable #15 (although any device or Virtual Instrument can be routed to any cable). This leaves three cables (16, 17, and "All") free for complex routing schemes involving Virtual Instruments. Using Virtual Instruments with cable outputs is discussed in the "All Menu" section which follows shortly.

#### *Sync Menu*

This menu allows you to send sync to any single device or Virtual Instrument. If you need to send sync to more than one device, create a Virtual Instrument consisting of a simple splitter routed to all devices that need to receive sync. This Virtual Instrument can be named and selected in the "Sync" pop-up menu.

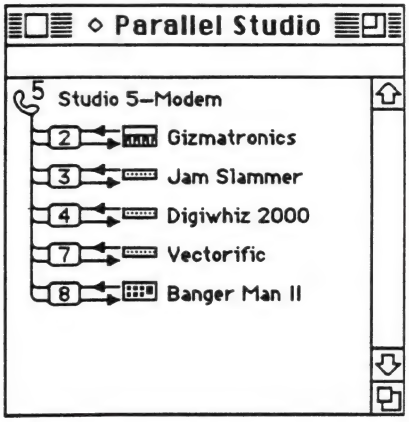
Implementation of the Studio 5's "All" function is slightly different (but much more flexible) than the "All" interaction between the MIDI Time Piece and Performer. In Performer, choosing the "All Cables" row causes data to be sent out *all cables* on that serial port. For example, the Performer cable assignment grid shown below would, with a real MIDI Time Piece, send data on Channel 1 to all 17 cables attached to the Macintosh Modem port.


Midi Channels
Playback assignment for Bass
Devices/Instruments
MIDI Channels
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
all
OUTPUT CABLE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
all
OK
Cancel

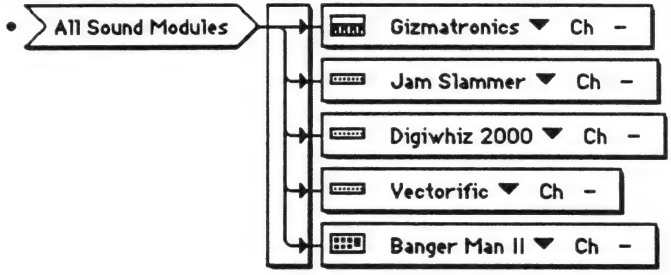
Performer's Tracks window would illustrate this assignment as Ma-1 (with the lower case "a" indicating "all" cables), as shown below.

When a Studio 5 emulates a MIDI Time Piece, the meaning of the word "All" can be defined. The "All" cable can send data to one or more devices by creating a Virtual Instrument (see Chapter 4). This Virtual Instrument would consist of a simple splitter routed to all devices that need to receive MIDI data. You would then select that Virtual Instrument in the "All" pop-up menu.

As an example, let's say you have a current Studio Setup document that looks as follows:

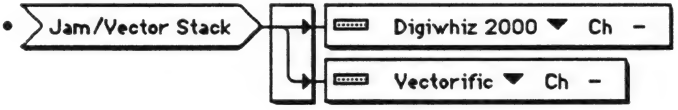



If you set up your Performer cable assignment grid as before (ie. Ma-1), and want the same results as if you used a real MIDI Time Piece (ie. MIDI Channel 1 sent out every cable), then you would define a Virtual Instrument within OMS. This Virtual Instrument would consist of a simple splitter module and all of your devices.




From the "All" pop-up menu in the MIDI Time Piece Out view, you would select the Virtual Instrument named "All Sound Modules". Whenever Performer played that track, MIDI data (on Channel 1) would be sent to the Gizmatronics, Jam Slammer, Digiwhiz 2000, Vectorific, and Banger Man II—just as if you used a MIDI Time Piece.

But, what if you don't want the MIDI data sent to *every* device in your studio? What if you only want data sent to the Digiwhiz 2000 and the Vectorific? You can design another Virtual Instrument as shown below.



You would choose "Jam/Vector Stack" from the "All" pop-up menu. Now, the same Performer track that, when used with a real MIDI Time Piece, played Channel 1 on every cable, would play Channel 1 *only* on the Digiwhiz 2000 and the Vectorific. This, as you can see, results in a more flexible cable handling arrangement.

*NOTE: Virtual Instruments can be used with any cable—they are not limited to the "All" cable only. Since a Performer track assignment grid contains 18 cable selections (cables 1-17 and "All"), and a Studio 5 has 15 ports, there are always at least three extra cable outputs available for Virtual Instruments.*

## COMPATIBILITY SETUP EXAMPLES

The following examples will illustrate various methods of using the Studio 5 with different types of non-OMS software. Specifically, let's look at two setups:

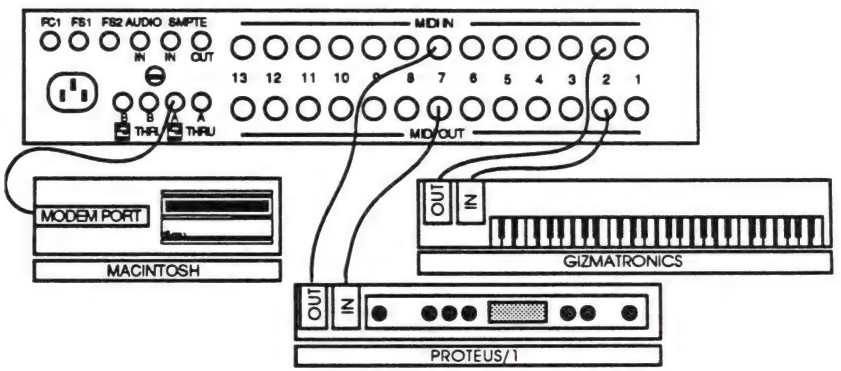
1) emulating a standard MIDI interface and using it with EZ Vision (without MIDI Manager)
2) emulating a MIDI Time Piece (fast mode) for use with Performer

Your own compatibility needs may differ, but these examples will help guide you through many of the basic configuration techniques.

### Example 1: Emulating a Standard MIDI Interface

In this example you'll use the Studio 5 to emulate a Standard MIDI Interface. You'll work with Opcode's EZ Vision sequencer and will not use MIDI Manager.

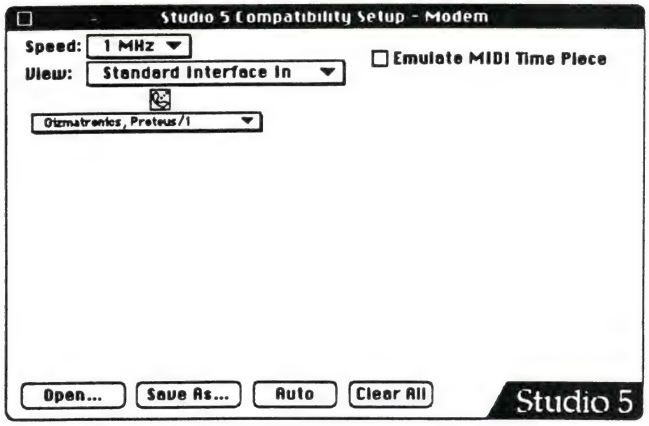
Assume that you have a simple studio consisting of a "Gizmatronics" master keyboard controller (plugged into MIDI port pair #2) and a Proteus/1 sound module (plugged into MIDI port pair #7). Also assume that only the Macintosh's Modem port is in use. Your Studio 5 connections look as follows:




- Open the **Studio 5/OMS Setup** application and choose **Compatibility Setup** from the **Studio 5** menu.

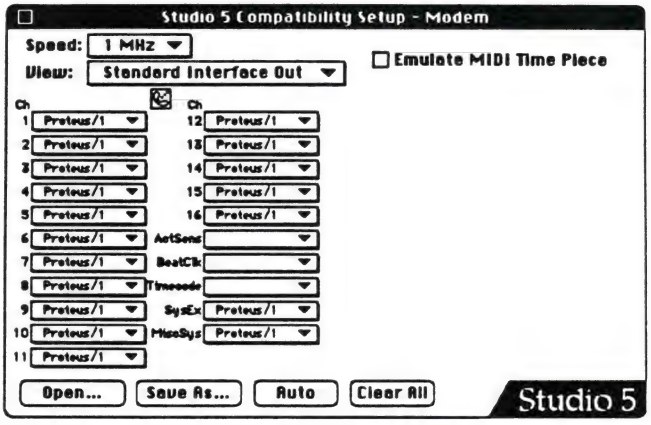
- Verify that **Emulate MIDI Time Piece** is NOT checked since you want the Studio 5 to emulate a standard MIDI interface.
- Choose **Standard Interface In** from the **View** pop-up menu.
- Choose MIDI source devices from the Modem side of the Compatibility Setup window.

In your simple studio you have only two devices; a Gizmatronics keyboard and a Proteus/1, as shown below.

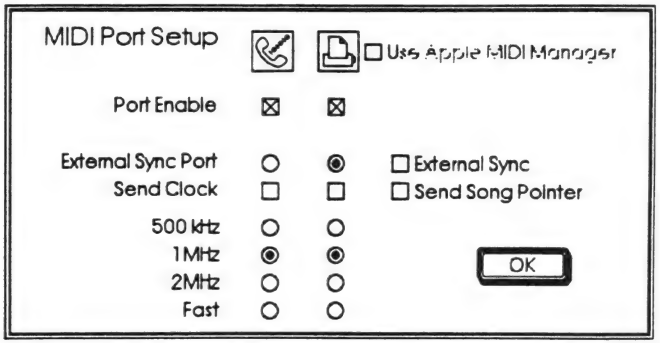



- Choose **Standard Interface Out** from the **View** pop-up menu.
- Select those devices that will be MIDI destinations from the Modem side of the compatibility window (or use the **Auto** button).

Since your simple studio has only 1 sound module, you'll send all 16 MIDI channels on the Modem port to the Proteus/1. You'll also enable other types of MIDI messages to be sent to the Proteus/1.



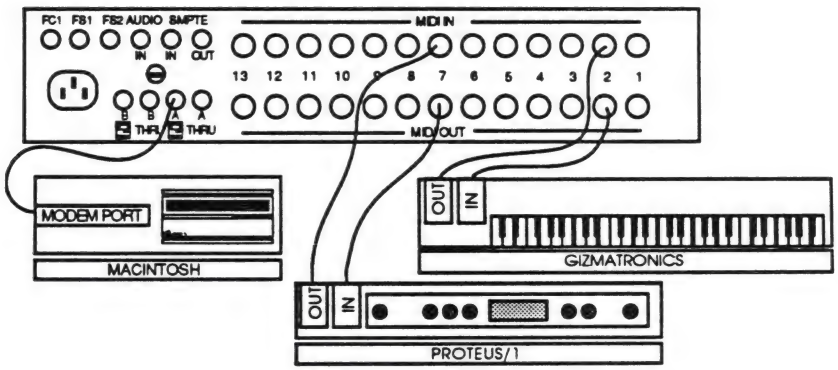
- Select patch number 1 on the Studio 5. This should be defined as your "do nothing" patch—the patch used for sequencing applications.
- Launch EZ Vision.
- Choose **MIDI Setup** from the **Setups** menu and make sure the Modem port is enabled, MIDI Manager is off, and the interface speed is set for 1 MHz.



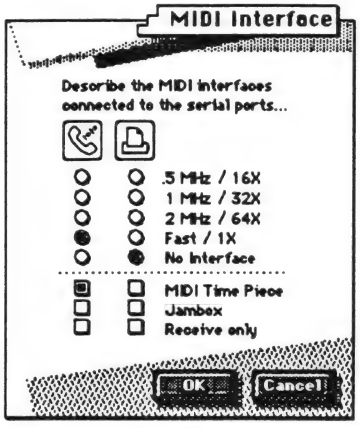

- EZ Vision can now be used as though attached to any standard MIDI Interface (such as an Opcode Studio 3 or MIDI Translator).

## Example 2: Emulating a MIDI Time Piece (FAST mode)

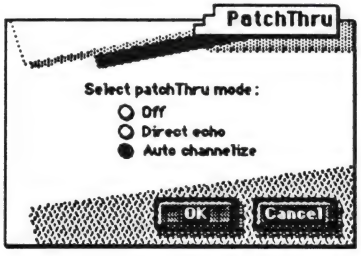
Performer comes with a demonstration sequence named "Night Move/Proteus". Use that file for this example. You'll configure the Studio 5 to emulate a MIDI Time Piece operating in FAST mode. All studios are different, but for this example, assume you have a very simple studio consisting of a "Gizmatronics" MIDI controller (plugged into MIDI port pair #2) and an E-mu Proteus/1 sound module (plugged into MIDI port pair #7). Also assume that the Studio 5 is connected only to the Macintosh's Modem port. Your studio looks as follows:



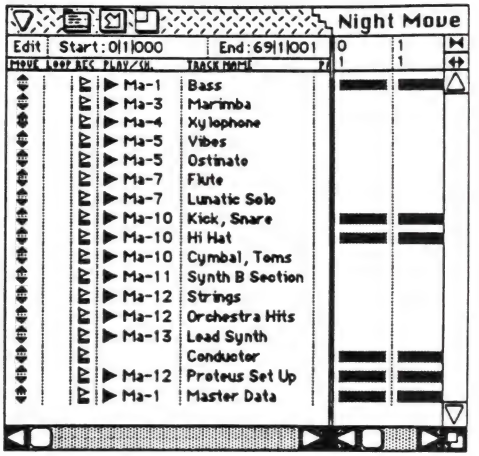
- Make sure that MIDI Manager is not in your System folder and launch Performer (Performer cannot enter FAST mode if MIDI Manager is in the System folder).
- Open the "Night Move/Proteus" file included with your Performer application.
- Choose **MIDI Interface** from the **Basics** menu and configure it as shown below. This indicates that a MIDI Time Piece (which is what the Studio 5 is emulating) is connected to the Macintosh's Modem port and that it is operating in FAST mode.



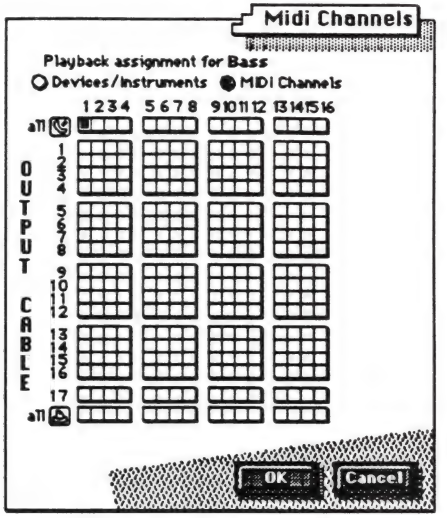

- Click **OK**.
- Choose **Patch Thru** from the **Basics** menu, select **Auto Channelize** and click **OK**.



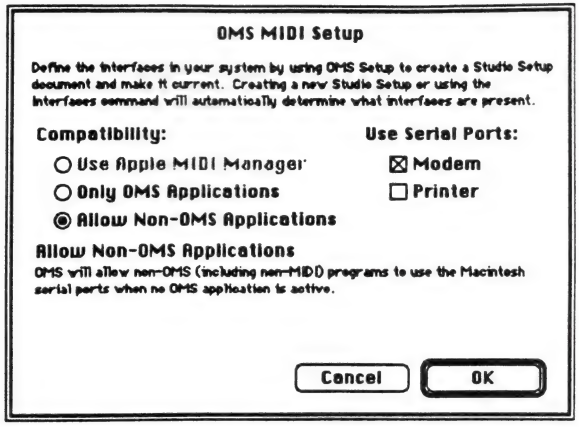

- Look at Performer's Track window.



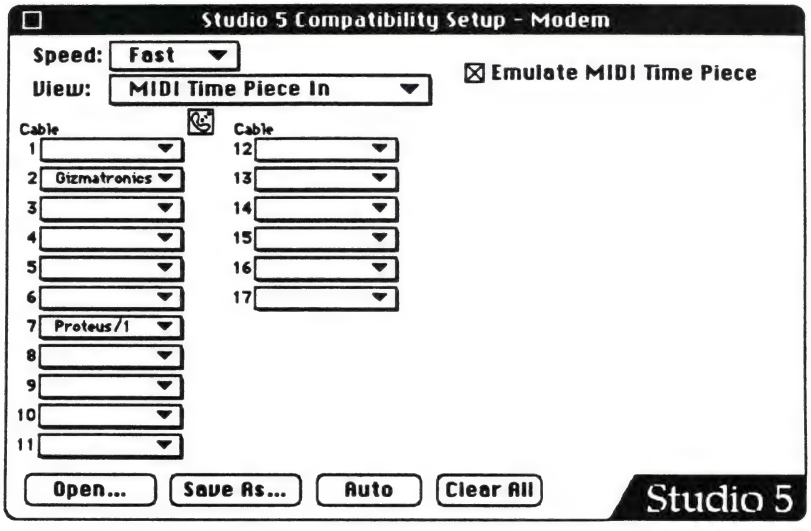

- Notice that each track is being sent out "All" MIDI Time Piece cables.



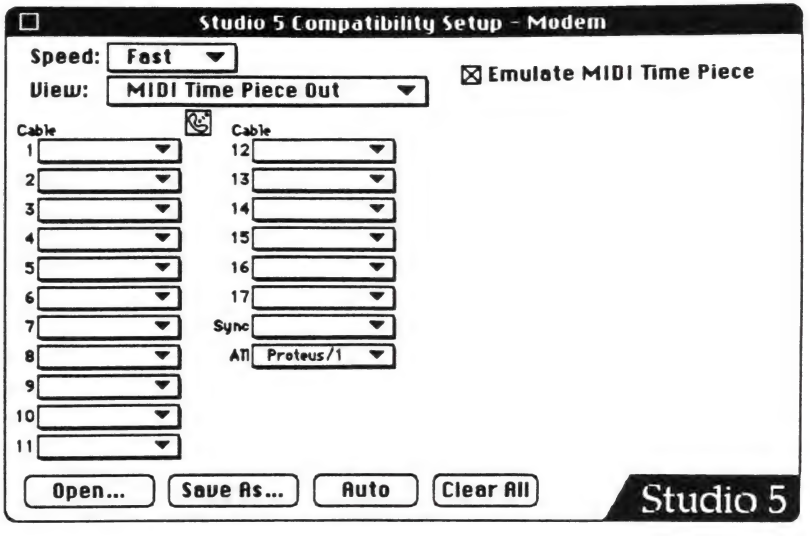

- Choose **OMS MIDI Setup** from the **Edit** menu.
- Select **Allow Non-OMS Applications** from the pop-up dialog box. This will allow non-OMS applications such as Performer to use the Macintosh serial ports.


OMS MIDI Setup
Define the interfaces in your system by using OMS Setup to create a Studio Setup document and make it current. Creating a new Studio Setup or using the Interfaces command will automatically determine what interfaces are present.
Compatibility:
Use Apple MIDI Manager
Only OMS Applications
Allow Non-OMS Applications
Use Serial Ports:
Modem
Printer
Allow Non-OMS Applications
OMS will allow non-OMS (including non-MIDI) programs to use the Macintosh serial ports when no OMS application is active.
Cancel
OK

- Choose **Compatibility Setup** from the **Studio 5** menu.
- Check the **Emulate MIDI Time Piece** box and choose **FAST** from the **Speed** pop-up menu.
- Choose **MIDI Time Piece In** from the **View** pop-up menu. Your studio has a Gizmatronics attached to port #2 and a Proteus/1 attached to port #7. Assign these ports to cables #2 and #7, respectively.

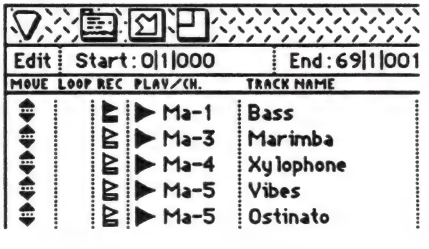



- Choose **MIDI Time Piece Out** from the **View** pop-up menu.
- Choose the Proteus/1 as the destination of the "All" cable routing (since the "Night Move/Proteus" Performer file has been configured to send data out "All" cables).

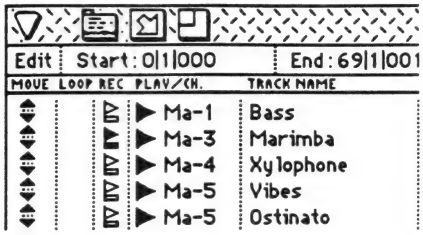



- Select patch number 1 on the Studio 5. This should be defined as your "do nothing" patch—the patch used for sequencing applications.
- Click Performer's **Play** button. Setup data will be sent to the Proteus and the demo sequence will begin playing.
- Click any track's record-enable icon and play your "Gizmatronics" controller to hear the Proteus/1 sound assigned to that channel.

The Gizmatronics will play the bass sound assigned to the Proteus/1 (Channel 1) if the "Bass" track is enabled as shown below:

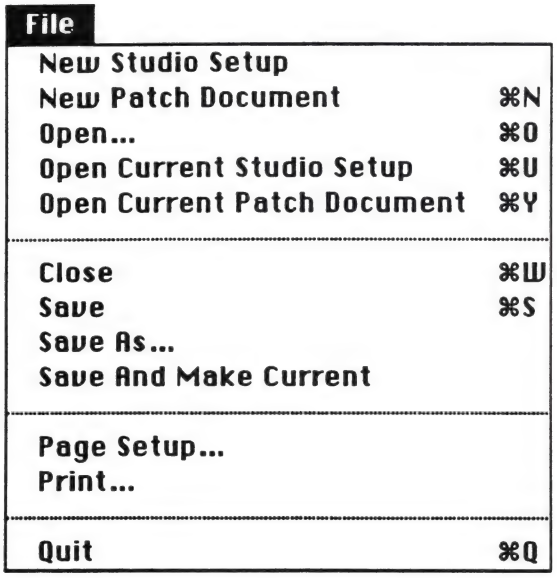


Similarly, The Gizmatronics will play the Marimba sound assigned to the Proteus/1 (Channel 3) if enabled as shown below:



# 6 Menus

## THE FILE MENU




This menu is very similar to the regular OMS Setup menu (as discussed in the OMS manual) and its functions can be found in that manual. Two new menu items are added when using OMS with the Studio 5, and some items behave differently depending on whether a Studio Setup or a Patch document window is active.

### New Patch Document ⌘N

Selecting this item opens a new, untitled Patch document. You can create and save 128 patches and any number of Virtual Controllers, Virtual Instruments and Program Change Sources.

### Open Current Patch Document ⌘Y

Selecting this command will open the Patch document that was most recently made the current document.

### Print

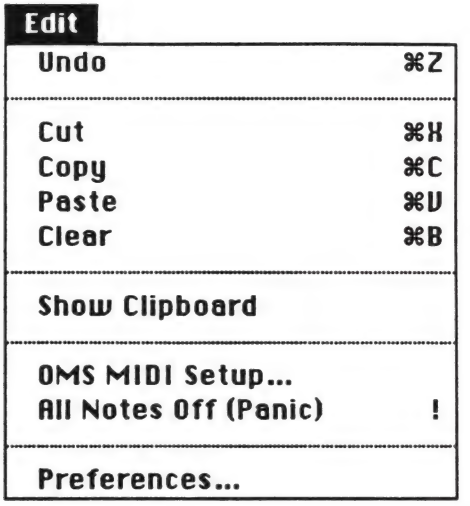
If a Studio Setup document is active, selecting this command will print a description of the active Studio Setup window.

If a Patch document window is open, (or any related windows such as Patch, Sequence, or Module editing windows) selecting the Print command will print a description of the active Patch document window.

### Other File Menu Differences

Other menu items such as Close, Save, Make Current, etc. apply to the active window. Therefore, if a Studio Setup window is active, these items will perform as discussed in the OMS manual. If a Patch document window is active, these items will perform similar operations on the Patch document.

## THE EDIT MENU



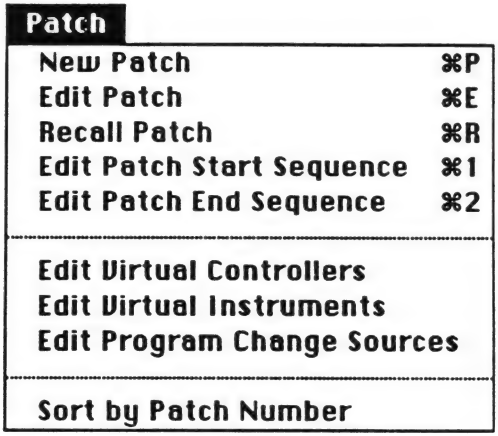

This menu is the same as the Edit menu discussed in the OMS manual. If a Patch document is the active window, these commands will be performed on selected items within that window instead of within the Studio Setup document.

## THE STUDIO MENU

This menu is identical to the Studio menu discussed in the OMS manual. It affects only the Studio Setup document and is grayed out if a Patch document is the active window.

## THE PATCH MENU

This menu becomes available when a window associated with an OMS Patch document is the active window. It is grayed out when another window is active.




**Patch Menu**

### New Patch ⌘P

Selecting **New Patch** from the **Patch** menu adds a new, empty patch to the Patch document. Each document can hold up to 128 patches.

### Edit Patch ⌘E

Selecting **Edit Patch** is the same as double-clicking on a patch's selector dot. Either action will open an editing window for that patch.

### Recall Patch ⌘R

Selecting **Recall Patch** is the same as clicking in a patch's diamond column. It makes the selected patch the current patch. After choosing **Recall Patch**, you will see a diamond next to the patch number. The patch is now active and its number is displayed on the front of the Studio 5.

### Edit Patch Start Sequence ⌘1

Selecting this item opens an editing window for a patch's Start Sequence. For information on editing and using Start Sequences, see the "Patch Sequences" section in Chapter 4.

### Edit Patch End Sequence ⌘2

Selecting this item opens an editing window for a patch's End Sequence. For information on editing and using End Sequences, see the "Patch Sequences" section in Chapter 4.

### Edit Virtual Controllers

Selecting **Edit Virtual Controllers** from the **Patch** menu will open the active Patch document's Virtual Controller editing window. Choosing this menu item is the same as clicking the **Virtual Controllers** button in the Patch document window. Editing of Virtual Controllers is discussed in the "Virtual Controllers" section of Chapter 4.

### Edit Virtual Instruments

Selecting **Edit Virtual Instruments** will open the active Patch document's Virtual Instruments editing window. Choosing this menu item is the same as clicking the **Virtual Instruments** button in the Patch document window. Editing of Virtual Instruments is discussed in the "Virtual Instruments" section of Chapter 4.

### Edit Program Change Sources

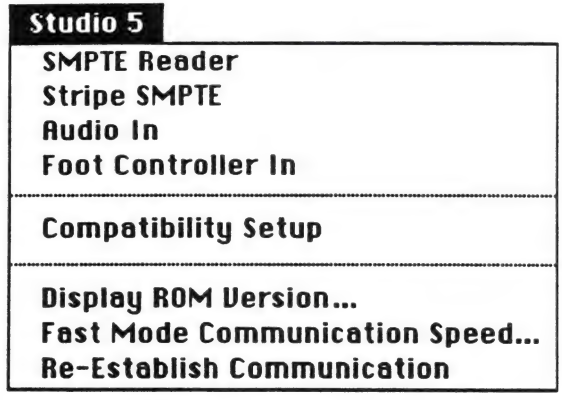
Selecting **Edit Program Change Sources** will open the active Patch document's Program Change Source editing window. Choosing this menu item is the same as clicking the **Program Change Sources** button in the Patch document window. Editing of Program Change Sources is discussed in the "Program Change Sources" section of Chapter 4.

### Sort by Patch Number

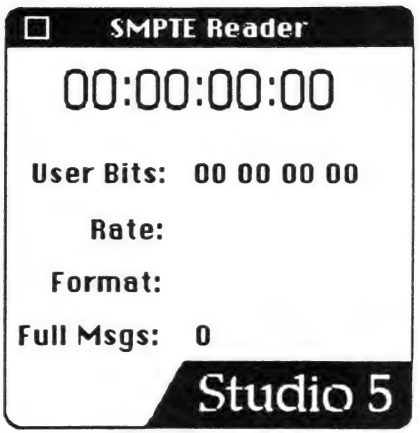
Choosing **Sort by Patch Number** from the **Patch** menu will arrange, in numerical order, all of the patches in the active Patch document window.

## THE STUDIO 5 MENU

The Studio 5 menu is enabled when your current Studio Setup document contains a Studio 5.




**Studio 5 Menu**




This window reads the SMPTE Time Code Signal at the Studio 5's SMPTE In jack. It will provide a reading of Time Code while the Studio 5 is striping as well as display Time Code coming from tape. It uses the format (MTC/DTL/DTLe) last set in the **Stripe SMPTE** window (see below).

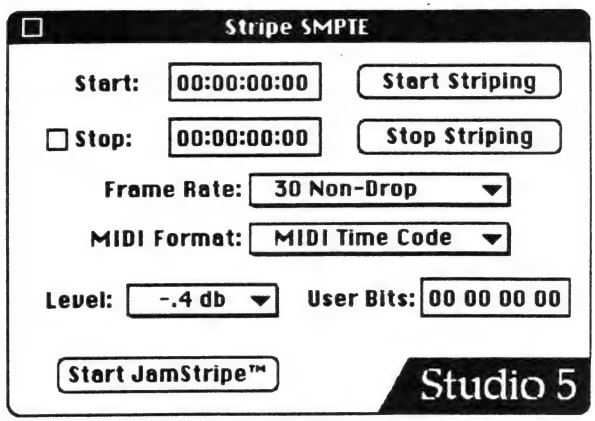
The window will also display the SMPTE rate and format, user bits (if any) and the number of Full Messages.

***NOTE:*** *The SMPTE Reader cannot distinguish between 29.97 non-drop and 30 non-drop. When the Studio 5 is reading 29.97 non-drop SMPTE, the SMPTE Reader will display the rate as 30 non-drop.*

Every time the Studio 5 achieves sync, it sends something called a "Full Message". During a normal syncing situation, you will get only one full message (when the Studio 5 initially locks to tape). If the tape is of poor quality, or the SMPTE signal is not strong enough, additional full messages will be sent. Each full message increments the counter and provides a good way to check the quality of your tape or incoming SMPTE signal.

***NOTE:*** *Direct Time Lock (DTL) and Enhanced Direct Time Lock (DTLe) are timecode implementations used by Mark of the Unicorn's Performer sequencer. In terms of what MIDI bytes are sent, DTL is identical to MIDI beat clock. Therefore, it's important that a sequencer does not receive both DTL and MIDI beat clock simultaneously unless the sequencer is receiving the messages before they are merged (as in Vision). DTL does not support MIDI Time Code user bits, so the user bits displayed when reading DTL are not what is on the tape.*

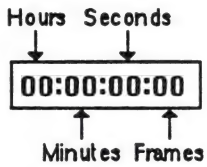
## Stripe SMPTE




Choosing **Stripe SMPTE** from the **Studio 5** menu opens the window shown above. The following sections will discuss the mechanics of this window. See Appendix B for a SMPTE striping tutorial.

### *Setting and Using Start and Stop Times*

The **Start** field contains the SMPTE start time. Reading from left to right, the numbers represent hours, minutes, seconds, and frames.



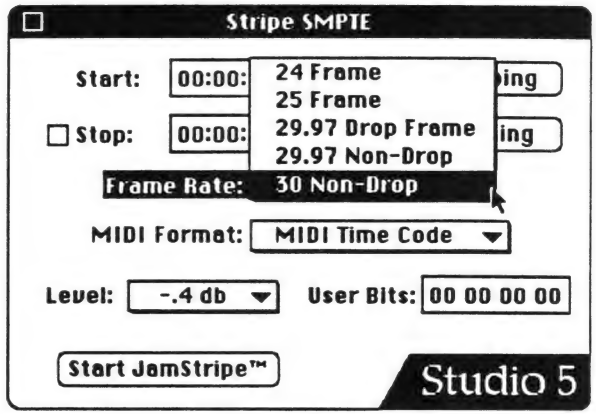

The Studio 5 can stop generating time code automatically. This is especially useful for unattended striping sessions. You can enter a stop time value in the **Stop** field. The check box to the left of the **Stop** field turns on the automatic stop feature. If the box is checked and a value is entered into the **Stop** field, the Studio 5 will automatically stop sending SMPTE timecode when that value is reached. If the box is not checked, the Studio 5 will ignore the Stop value, and continue striping until the **Stop Striping** button is clicked.

The Studio 5 will begin to generate SMPTE timecode from its SMPTE Out jack as soon as the **Start Striping** button is clicked. The SMPTE value will begin at the time specified in the Start field. The Studio 5 will cease to generate SMPTE timecode when the **Stop Striping** button is clicked (or when the Stop field value is reached and the Stop checkbox is checked).

***NOTE:*** *The Stop checkbox must be checked BEFORE clicking the* ***Start Striping*** *button. If you check the Stop checkbox AFTER clicking* ***Start Striping****, then striping will not stop automatically.*

As an example, let's say you wanted to stripe a tape with exactly 33 minutes of time code, and you wanted this stripe to begin at 1 hour SMPTE time. You would type 01:00:00:00 into your **Start** field, check the Stop checkbox, enter 01:33:00:00 into your **Stop** field, roll tape, and press the **Start Striping** button.

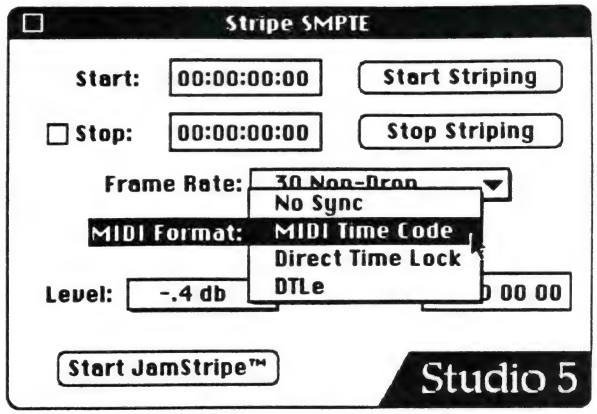
## *Setting and Using SMPTE Frame Rates*




**Setting SMPTE Frame Rate**

One of 5 SMPTE frame rates can be chosen from the **Frame Rate** pop-up menu. The chosen rate is generated within the Studio 5 and sent from its SMPTE Out jack when the **Start Striping** button is clicked. The following is a brief description of the various SMPTE frame rates.

- 24 Frame: Film frame rate.
- 25 Frame: EBU (European) television frame rate.
- 29.97 Drop Frame: NTSC color television frame rate.
- 29.97 Non-Drop: Used to sync to NTSC color television without dropping frames. SMPTE time does not match real-time, but playback pitch is unaffected.
- 30 Non-Drop: Original NTSC black and white television standard. Often used in audio-only situations since there are no dropped frames and the SMPTE time is equal to real time.

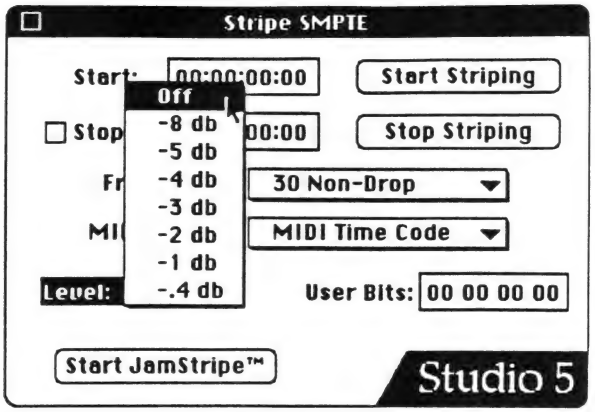



**Setting MIDI Format**

From the **MIDI Format** pop-up menu, choose which MIDI sync format you will be using. While the Studio 5 is generating SMPTE timecode, it is also sending this value back to the Macintosh where it can be monitored by the SMPTE Reader window. This not only sets the MIDI format returning to the Macintosh during striping, but also determines the MIDI format used when reading SMPTE from an external source.

- No Sync: The Macintosh does not read the value of the SMPTE signal.
- MIDI Time Code: The Macintosh uses MIDI Time Code to read the value of the SMPTE signal.
- Direct Time Lock: The Macintosh uses Direct Time Lock to read the value of the SMPTE signal.
- DTLe: The Macintosh uses Enhanced Direct Time Lock to read the value of the SMPTE signal.

***NOTE:*** *Direct Time Lock (DTL) and Enhanced Direct Time Lock (DTLe) are timecode implementations used by Mark of the Unicorn's Performer sequencer. In terms of what MIDI bytes are sent, DTL is identical to MIDI beat clock. Therefore, it's important that a sequencer does not receive both DTL and MIDI beat clock simultaneously unless the sequencer is receiving the messages before they are merged (as in Vision). DTL does not support MIDI Time Code user bits, so the user bits displayed when reading DTL are not what is on the tape.*




**Setting SMPTE Output Level**

The pop-up **Level** menu lists eight settings for the Studio 5's SMPTE output level. Choose one that provides the best input signal for your particular tape recorder. The following guide covers the optimum input levels for various types of machines. Adjust the **Level** command to give a SMPTE input value closest to the following.

- If your tape machine operates at -10 dB, adjust the SMPTE output level for a tape input of about -3 dB.
- If your tape machine operates at +4 dB, adjust the SMPTE output level for a tape input of about -7dB.
- If you are using a -10 dB machine with LED metering, adjust the SMPTE output level for a tape input between -1 and -2 dB.
- If your audio recorded uses dbx noise reduction and you can't defeat it, adjust the SMPTE output level for a tape input between -1 and 0 dB.
- If you have a mixer in the SMPTE signal path (and you shouldn't), make sure that the equalization is either switched out or flat. Any filtering of the SMPTE signal will render it invalid.

## JamSync

JamSync (or "regeneration") generates fresh SMPTE signal from the SMPTE Out jack in sync with the signal being received at the SMPTE In jack. Since SMPTE is a digital signal, it degrades when it's recorded on tape. Multiple copies of a tape can degrade the SMPTE signal enough to make it unreadable. If you make a copy directly from one tape to another, you should always regenerate the SMPTE signal. If, therefore, you want to copy a multitrack tape and its SMPTE track, connect the Studio 5 between the two tape recorders. The Studio 5 will generate a fresh copy of SMPTE from the original tape's signal regardless of any dropouts in the original copy. This is know as JamSyncing.

***NOTE:** The Studio 5's JamSync feature is always enabled unless the Stripe SMPTE window's pop-up **Level** menu is set to **Off**. You will want to turn off JamSync if you're not regenerating SMPTE (such as when you're using the Studio 5 to sync a sequencing application to tape).*

### *Start JamStripe™ Button*

JamStripe™ takes JamSync one step further. If a tape has a very large drop-out in the SMPTE signal, or if the SMPTE signal stops at some point in the tape, JamStripe will cause the Studio 5 to continue generating timecode without having any SMPTE present at the SMPTE In jack. To stop generating, click the **Stop Striping** button. If you have a tape in need of this kind of service, click the **Start JamStripe™** button when you make a copy of the tape. The Studio 5 will JamSync until it reaches the end of the SMPTE signal, at which point it will switch seamlessly into a generating mode.

***NOTE:*** *When JamSyncing or JamStriping, the SMPTE frame rate at the SMPTE Out jack is the same as that being received at the Studio 5's SMPTE In jack. The SMPTE* ***Frame Rate*** *pop-up menu has nothing to do with the SMPTE signal in either JamSync or JamStripe modes. You can view the actual SMPTE frame rate by using the SMPTE Reader window.*

### *User Bits*

This field allows you to enter User Bits as defined by the SMPTE standard. User Bits are often used to mark off and identify various sections of a tape.

### Audio In

This enables the Studio 5's audio-to-MIDI conversion feature. Choose the menu item to check and uncheck it. You can use **Audio In** to sync Vision (or Studio Vision) to an external audio signal. Audio In status is saved within the Studio 5's internal memory. See Appendix C for a short tutorial.

### Foot Controller In

This enables the Studio 5's continuous foot controller (FC1). Choose the menu item to check and uncheck it. Foot Controller In status is saved within the Studio 5's internal memory.

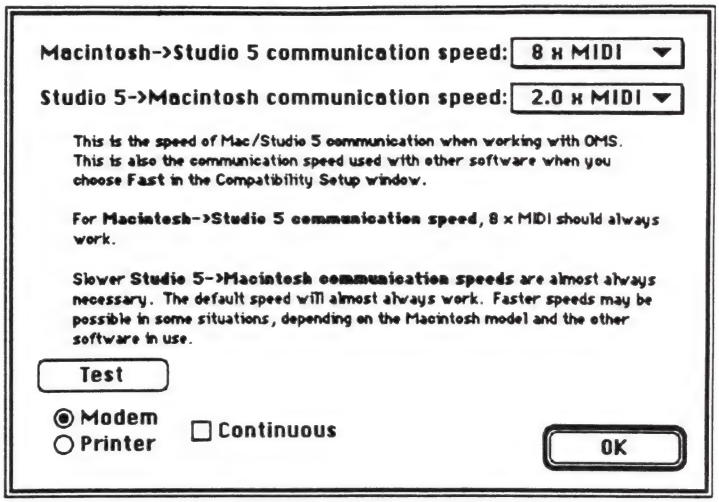
### Compatibility Setup

This opens a configuration window in which the Studio 5 can be set to emulate either a standard 2 port MIDI interface or a MIDI Time Piece. See "Using the Studio 5 with Non-OMS MIDI Software" in Chapter 4 for details on using this window.

### Display ROM Version...

This will display the Version numbers of your Studio 5's two internal ROMs. You should know your ROM versions if you call Opcode Technical Support about your Studio 5. Registered users will be notified of ROM updates.

## Fast Mode Communication Speed...


Macintosh->Studio 5 communication speed:
8 x MIDI
Studio 5->Macintosh communication speed:
2.0 x MIDI
This is the speed of Mac/Studio 5 communication when working with OMS. This is also the communication speed used with other software when you choose Fast in the Compatibility Setup window.
For Macintosh->Studio 5 communication speed, 8 x MIDI should always work.
Slower Studio 5->Macintosh communication speeds are almost always necessary. The default speed will almost always work. Faster speeds may be possible in some situations, depending on the Macintosh model and the other software in use.
Test
Modem
Printer
Continuous
OK

Communication Speed Window

Use this window to set a communication speed between the Macintosh and the Studio 5. Greater data throughput is obtained by transferring data at speeds faster than the MIDI standard. This can result in an increase in the number of simultaneous MIDI channels as well as improved timing—particularly in sequences with a dense MIDI data stream (e.g. numerous chords, 16th notes, timing information, and continuous controllers).

A Macintosh->Studio 5 communication speed of 8 x MIDI should work in most instances, however the Studio 5->Macintosh communication speed may need to be slightly slower. This is because some Macintoshes may not be able to receive data at an 8 x MIDI communication speed reliably.

You should start with a Macintosh->Studio 5 communication speed of 8 x MIDI and a Studio 5->Macintosh speed of 2.0 x MIDI. It may be possible to increase the Studio 5->Macintosh speed on some computers (depending on what software is running). This will allow even more simultaneous MIDI streams to be transmitted to the Macintosh (e.g. playing multiple controllers). If you see messages stating that overrun errors occurred, you'll need to decrease the Studio 5->Mac communication speed.

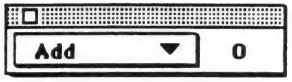
Experiment with different Studio 5->Macintosh communication speeds by recording a sequence. Make sure that **OMS MIDI Setup...** is set for either "Use Apple MIDI Manager" or "Only OMS Applications" mode (see your OMS manual, if necessary). Choose **Fast Mode Communication Speed...**, check the **Continuous** checkbox, then click the **Test** button. The Studio 5 will begin to send about 4K of MIDI at the current speed settings. Click the mouse to stop continuous testing—any data loss will be reported.

### Re-Establish Communication

On rare occasions, the Studio 5 may lose contact with the Macintosh. This can be caused by a lost MIDI message (due to AppleTalk being on, for example) or a software error within the Mac or Studio 5. You won't need to use this command unless you see an alert message on the Macintosh telling you that you need to re-establish communication.

# Appendix A: Working with Opcode Applications

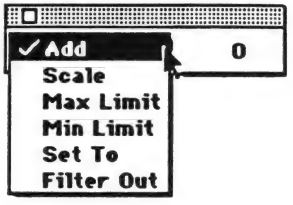
Often, in this manual, you'll see references to "numericals" and "pop-up menus". The diagram below shows a typical editing window containing both a pop-up menu and a numerical.




## POP-UP MENUS

You can always tell a pop-up window in an Opcode application by the downward-pointing arrow. Clicking on the arrow will open up a pop-up menu from which you can select an appropriate choice.

- Click and hold the downward facing arrow. A pop-up menu will appear.
- Move the mouse (with the button still down) over the item you wish to select, then release the mouse button.

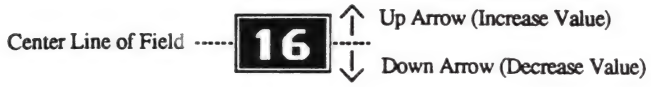



- The field will change to show your new selection.

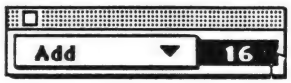
## NUMERICALS

Numericals are editable value fields. You can tell when a field can be edited by its bold type. Opcode programs give you numerous ways to edit the value of a numerical.

- The first way is to position the cursor either just above or just below an imaginary center line running through the numerical. The cursor will turn into either an upward or downward pointing arrow depending on its position relative to the center line.




When the cursor is an up arrow, single clicks on the mouse will increment the value contained in the numerical. Clicking and holding down the mouse will cause the numericals to increase rapidly in value.




Likewise, when the cursor is a down arrow, single clicks on the mouse will decrement the value. Clicking and holding down the mouse will cause the numericals to decrease rapidly in value.

- Another way to change numericals is to use the mouse as a "slider". To change a numerical in this way, click on it, and, while holding down the mouse button, drag it in a vertical direction. Pushing the mouse away from you increases values. Pulling it toward you decreases values. The cursor will disappear while the value is changing and reappear when you release the mouse button.
- Some numericals allow you to simply type in a value. First, click in the numerical box, then type a number and press Enter or Return. The numerical changes to reflect the new value. You will not be allowed to enter invalid values.

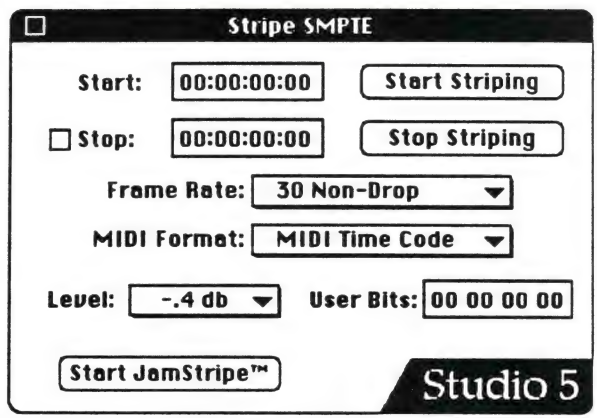
# Appendix B: Working with SMPTE

## STRIPING A TAPE

Unless you already have tapes with SMPTE on them, you will need to put SMPTE timecode onto a blank tape. This process is usually called "striping" a tape with SMPTE.

To stripe a new tape with SMPTE timecode, familiarize yourself with the **Stripe SMPTE** window (see Chapter 6) as well as the operation of your tape recorder. A typical striping operation might go something like this:

- Use a new roll of recording tape and turn off any noise reduction on your tape recorder. Do not use any equalization or alter the SMPTE signal in any way.
- Make sure that your Studio 5 is connected as discussed in "Chapter 3: Installation".
- Choose **Stripe SMPTE** from the **Studio 5** menu. The following window will appear.




**Stripe SMPTE Window**

- Enter the SMPTE frame rate using the **Frame Rate** pop-up menu. Enter a Start time. If you wish the striping to stop automatically, enter a Stop time and check the Stop checkbox. If desired, enter the User Bits. Set a SMPTE output level.
- Choose a MIDI Format.
- Put your tape recorder into Record mode, but paused.

- Click the cursor on the **Start Striping** button in the **Stripe SMPTE** window and the Studio 5's SMPTE/Power LED will begin to flash. You should see the SMPTE signal level on your recorder's input meters. Verify that the proper amount of SMPTE signal is going onto tape (see "Guide to Setting SMPTE Levels" under the "Stripe SMPTE" window description in Chapter 6).
- If necessary adjust either the SMPTE output level on the Mac, or the input level on your tape machine.
- When you are satisfied with the levels, click on the **Stop Striping** button in the **Stripe SMPTE** window.
- You can monitor the SMPTE time by choosing **SMPTE Reader** from the **Studio 5** menu.
- Turn off the Pause on your audio recorder to begin recording. When tape is rolling, click the **Start Striping** button in the **Stripe SMPTE** window.
- SMPTE timecode will stop generating when it reaches the time specified in the **Stop** field if the Stop checkbox is checked.
- If the Stop checkbox is unchecked, you can click **Stop Striping** when you reach the end of the tape.
- When you are finished striping, the Studio 5's SMPTE/Power LED will cease to flash. Click on the close box to close the **Stripe SMPTE** window.

## SYNCING TO TAPE

Once you have a tape with SMPTE striped on it, you can use the Studio 5 to synchronize the Macintosh to the tape.

- Connect the SMPTE track output of your multitrack tape recorder to the Studio 5's SMPTE In jack (as discussed in the "Audio Connections" section of Chapter 3).
- Connect the computer as discussed in the "Computer Connections" section of Chapter 3.
- Choose the desired MIDI Format in the **Stripe SMPTE** window (No Sync, MTC, DTL, DTLe).
- Turn JamSync off by choosing **Off** from the **Stripe SMPTE** window's pop-up **Level** menu (JamSync is discussed in Chapter 6).
- Put your tape machine into play mode.
- Verify that the SMPTE/Power LED is flashing. When the Studio 5 detects valid SMPTE code at its input, the SMPTE/Power LED flashes and MIDI Time Code (or, if selected, DTL or DTLe) is sent to the computer.
- View the SMPTE timecode by choosing **SMPTE Reader** from the **Studio 5** menu. For more information on the SMPTE Reader window, see Chapter 6.

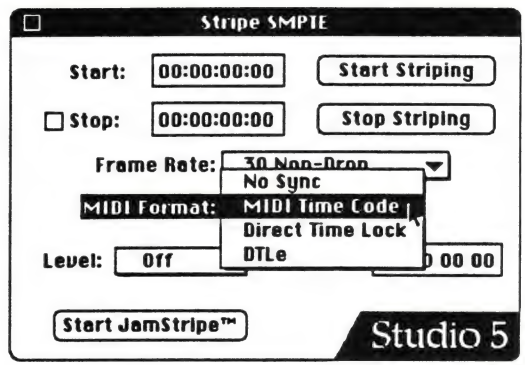
The Studio 5 performs an operation known as "flywheeling". If your multitrack tape has timecode dropouts, the Studio 5 will continue to send timecode to the Macintosh as if the signal were still present at the input. If the Studio 5 loses sync there could be one of a number of problems. See "Studio 5 loses sync" in "Appendix D: Troubleshooting" for more information.

## SMPTE, Vision, and the Studio 5

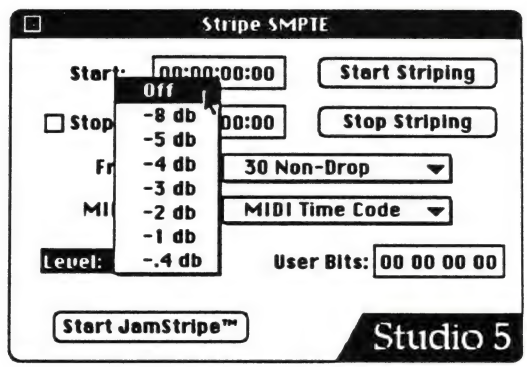
The following discusses using the Studio 5 with Vision. The information is also applicable to working with Studio Vision.

Vision uses MIDI Time Code for synchronization, so...

- Choose **Stripe SMPTE** from the **Studio 5** menu and choose **MIDI Time Code** from the **MIDI Format** pop-up menu.




- Turn off JamSync by selecting **Off** from the **Stripe SMPTE** window's **Level** pop-up menu.




- Choose **Receive Sync Mode** from Vision's **Options** menu and choose **MIDI Time Code** from the pop-up menu.
- Choose **Receive Sync Device** from Vision's **Options** pop-up menu and choose the Studio 5.

- Select the desired playback sequence, its **Sync** and **Offset**.
- Click **Play** in Vision's Control window. The Status display will read **"Waiting for Sync"**.
- Hit **Play** on your tape recorder and Vision will start playing back in sync with the tape.

Use a similar procedure for recording tracks into Vision while synced to tape. For more information concerning Vision's various sync modes, see your Vision manual.

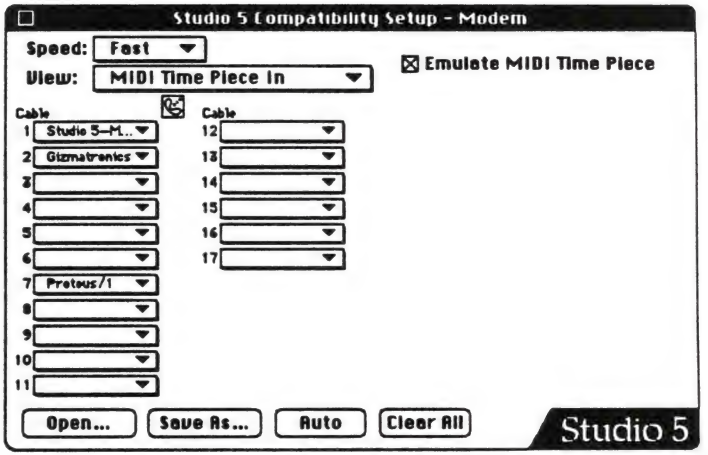
## SMPTE, Performer, and the Studio 5

This tutorial is based on the one in "Example #2: Emulating a MIDI Time Piece" in the "Compatibility Setup Examples" section of Chapter 5. See that example for studio and set up assumptions. This tutorial will further assume that your tape is striped with 30 FPS SMPTE, and that you'll use MTC to lock Performer to the audio tape.

- Launch Performer, open the "Night Move/Proteus" file, and set Performer's MIDI Interface dialog as discussed in Chapter 5.
- Open the Studio 5/OMS Setup application, make sure OMS is in "Allow non-OMS applications" mode, and set the Compatibility Setup windows as discussed previously.

You want the "Night Move/Proteus" file to sync to an external SMPTE source, so you'll need to perform the following additional steps:

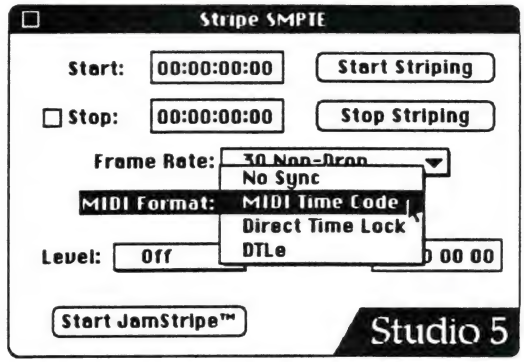
- Choose the Studio-5 as an input device in the Studio 5/OMS Setup Compatibility window.



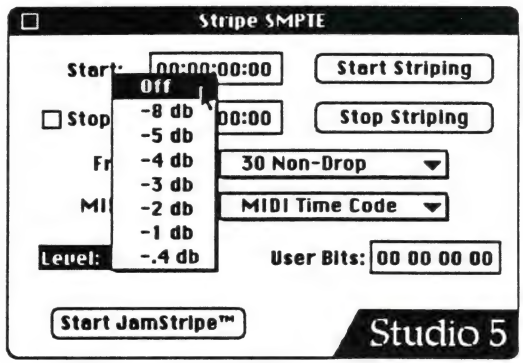

It doesn't matter which cable you use for the Studio 5 input—only that one of the cables lists the Studio 5 as an input. Footswitch, timecode, and audio in events will appear to Performer as having come from that cable.

You'll be using MIDI Time Code, so...

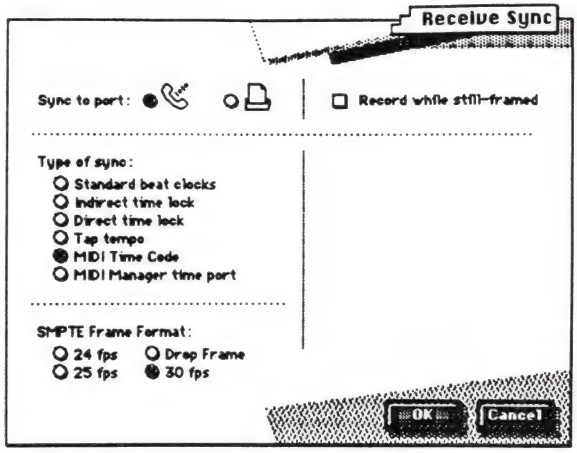
- Choose **MIDI Time Code** from the **Stripe SMPTE** window's **MIDI Format** pop-up menu.




- Turn off JamSync by selecting **Off** from the **Stripe SMPTE** window's **Level** pop-up menu.




- Choose **Receive Sync** from Performer's **Basics** menu and set the window as shown in the following illustration:




- Check **Slave to External Sync** in Performer's **Basics** menu. It should have a check to the left of its name. This causes Performer's playback to be locked to MTC.
- Hit the **Play** button in Performer. It will be greyed out, indicating that Performer is waiting to receive external sync.
- Hit **Play** on your tape recorder. The "Night Move/Proteus" sequence will begin to play back in sync with the tape recorder.

***NOTE:*** *Unless your tape is at SMPTE time 0:00:00:00, it will be necessary to set a SMPTE offset in Performer's Counter window. See your Performer manual for details.*

***NOTE:*** *Performer may have difficulty handling timecode, beat clock, active sensing, and note data all on one serial port. If you will be using Performer in this situation, either change your OMS Setup to use both Macintosh serial ports, or design an OMS patch to filter out any unnecessary data.*

# Appendix C: Using Audio In with Vision

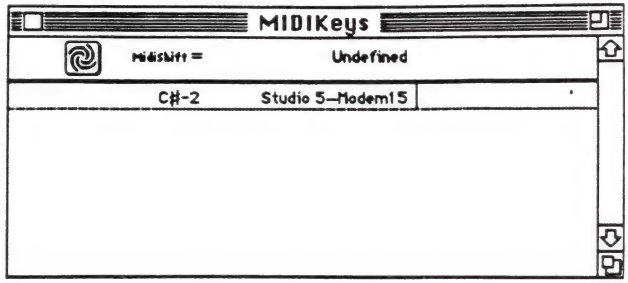
This appendix discusses creating a tempo track in Vision or Studio Vision (versions 1.1 or later) using the Studio 5's Audio In feature.

Suppose that you have a live band recorded on two tracks of a 4-track tape, and that you'd like to supplement the recording with some sequenced virtual tracks. Follow this step-be-step procedure for using the Studio 5 Audio In feature with Vision.

- Make certain you have two blank tape tracks. You'll need one for an audio click track and one for SMPTE time code.
- Record a click track onto a blank tape track.

A rim shot or similarly percussive sound works well. You'll want to include a one or two bar count-off before the song begins. The best way to do this is to turn the tape backward (so when you play the tape, you hear the music backwards), and record the click track this way. When the end of the song is reached, record an additional two bars. When the tape is played in the forward direction, you'll have two bars of clicks before the music begins. The click level should be between -2dB and +2dB.

- Record a SMPTE stripe on the remaining track, making sure it begins a few seconds before the click track you just recorded.
- Make sure that **Audio In** is checked in the "Studio 5/OMS Setup" application's **Studio 5** menu.
- Record enable the TEMPO track of an empty sequence. Click on the tempo number itself, so it is selected.
- Set the record mode to "Wait for Note".
- Set the sync mode to "Internal".
- Play the beginning of the song. Use the Macintosh's "single quote" (') tap tempo key to tap along with the song to establish a rough tempo. This will preset the sequence to about the right tempo.
- Make sure MIDIKeys are enabled in Vision's **Setups** menu.
- Make sure the Studio 5 is enabled in Vision's **Enable Input Device** dialog box.
- Open the MIDIKeys window and choose "Add Line" from it's Mogrify menu. Click the left side of the new line, and play a rim shot or similarly percussive sound into the Studio 5's Audio In jack. The Studio 5 will respond with a note (C#-1 or C#-2 on Channel 15 of the Printer Port, depending on the Middle C setting in the preferences menu selection).
- Click the right side of the new line, and type the single quote key ('). Your MIDIKey is now set up as shown below.




- Verify that the tempo track is still record-enabled.
- Start the tape and listen to the countoff go by.
- Play a MIDI note on the down beat of the first bar of your song. This will initiate recording of the tempo track. The actual note will not be recorded.
- Let the song play through until the end.
- Stop recording in Vision. Then stop the tape.

In the List Editing window of the tempo track you will see one tempo change event for every beat. This is the tempo Vision has extracted from the click. It is, however, one beat later than it should be: each event is at the time it was recorded (indicating the tempo of the past beat), but needs to be moved to the beginning of the beat (so the beat will play at the right tempo). To correct this, you will have to shift all the tempos one beat earlier.

- Set the start time in the upper left corner of the tempo track's List Editing window to 1 1 0, and the end time to one beat later.
- Choose Delete Time from the Mogrify menu. If there was an event at 1 1 0, it will be deleted. Now the tempo track should correctly describe the tempos of the click signal on the tape.
- Find the SMPTE time of the down beat of bar one and set the Start Time (off-set).

If you don't know the SMPTE time of the down beat, then set the sync mode to "Time Code", and turn off the Studio 5's Audio In feature in the **Studio 5** menu. Play the tape and watch the SMPTE numbers on Vision's counter display. Set the sequence's Offset to a SMPTE number five to ten seconds before the approximate down beat of bar one. Then, select an empty track, rewind the tape, click on Record, and start the tape. Listen to the countoff and record a note on the down beat of the first bar. Open the List window for that track, and look at the absolute SMPTE time of the note you recorded. Use this time as the actual Offset for the sequence.

You may have to adjust the 80ths of a frame of the Offset to make it exact—especially if there is no specified offset from the previous recording session.

Once you have a SMPTE Offset and the tempo "map" in the tempo track of a sequence, you can record and play Vision's MIDI tracks in sync with the music on tape. You can copy the tempo track and Offset to other sequences if you wish to record several MIDI versions for that tape recording.

# Appendix D: Troubleshooting

## STUDIO 5 DISPLAY PROBLEMS

*Studio 5 displays a zero*

No patches have been defined. The Studio 5 is either new, has been reset, or you have just deleted the current patch. As new patches are defined in the Studio 5/OMS Setup application, they will be sent to the Studio 5. Opening the current Patch document will send patch data to the Studio 5 automatically. Patch #0 is a "do nothing" patch.

*Studio 5 displays a negative number*

When the Studio 5 encounters an error condition, it will display an error message. Error messages are recognized by a minus sign preceded by a number. The following is a list of Studio 5 error messages:

1 not enough memory in Studio 5 to complete a command

2 memory management error

3 memory management error

4 a command parameter was out of range

5 a command size was out of range

6 internal processor error

7 already executing another command

8 a Studio 5 serial port is busy

9 memory management error

10 Studio 5 received an undefined command

12 memory test failed (memory not valid)

## COMMUNICATION PROBLEMS

*Macintosh loses communication with Studio 5*

Choose the **Re-Establish Communication** command from the **Studio 5** menu.

If that doesn't work, turn off the Studio 5. Hold in both inc/dec buttons while turning the Studio 5 back on. This resets the Studio 5 and empties its patch memory.

If the Studio 5 was turned off and then on while OMS was running, the Mac will not communicate with the Studio 5 again until...

a) you open the OMS MIDI Setup dialog and then click OK or Cancel.

b) OMS becomes inactive and then active (this happens when using Allow Non-OMS Applications mode and you switch to a non-OMS application and back to an OMS application).

*You receive an Overrun Error Message on the Macintosh*

This message indicates that some information may have been lost by the Macintosh serial port. Too much data is being transmitted too quickly to the Macintosh. Try thinning the MIDI data stream being sent to the Mac. Refer to "Studio 5 Loses Sync" in the "Sync Problems" section for various ways to thin the MIDI data stream.

If thinning the data stream either doesn't help or isn't possible, you will need to set a slower Studio 5->Macintosh communication speed. Lower the speed in single step increments until the problem disappears.

## PERIPHERAL PROBLEMS

*Images on the Macintosh screen appear distorted*

The Studio 5 should be located at least 2 feet away from your computer monitor.

*Unresponsive modems, initialized printers, etc.*

If the problem peripheral is connected directly to the Macintosh's serial port, you should choose **OMS MIDI Setup** from the **Edit** menu, uncheck that port's checkbox, and click **OK**.

## SYNC PROBLEMS

*Studio 5 will not stripe tape*

Make sure the power cord is firmly inserted into its connector, the power switch is on, and that the SMPTE/Power indicator light is lit.

Check all cables between your computer and the Studio 5, and between the Studio 5 and your tape deck.

Check the input level to your tape deck. Set levels as discussed in the "Guide To Setting SMPTE Levels" section in Chapter 6.

*Studio 5 loses sync*

Make sure that the heads on your tape deck are clean and that your are using a quality tape in good condition. Old or worn tape will have numerous dropouts that may cause the Studio 5 to lose sync.

If you are syncing to tape, and your sequencer keeps starting and stopping erratically, you are probably losing sync. One possibility is that your SMPTE source is not good. This can be because you have a bad tape or possibly a bad connection from your tape machine to the Studio 5's SMPTE in jack. This is easy to verify; if the Studio 5's SMPTE indicator light does not start blinking regularly when you try to sync, the Studio 5 is not getting a correct signal. Check your cables and make sure that the recorded SMPTE level is sufficient (see Chapter 6 for a guide to SMPTE recording levels). If the tape was recorded with too high a SMPTE level, then it will have to be re-striped. If SMPTE was recorded at too low a level, you will need to boost the signal using a preamp or mixer between your tape deck and the Studio 5's SMPTE IN. Also, make sure that the heads on your tape deck are clean and that you're using a quality tape in good condition. Old or worn tape will have numerous dropouts that may cause the Studio 5 to lose sync.

If the Studio 5's SMPTE indicator light blinks regularly, you most likely have too much data going from the Studio 5 into the Mac. Some instruments output active sensing or MIDI clock messages constantly, whenever they are on. MIDI clock messages especially can be a problem, because they are sent more often than active sensing. Or, you could have a device sending MIDI Time Code. You don't need this if you're trying to sync your sequencer to the Studio 5's MIDI Time Code. In general, if you tell a real time application (such as a sequencer) to play, and then send it too much data, it will start to lose some of the data. If it loses timecode data, it will lose sync.

See if any MIDI devices attached to the Studio 5 are transmitting data to the Studio 5 (make sure none of them are playing). Look at the red Studio 5 MIDI In LEDs. If any are lit or flashing, you know those devices are constantly sending some kind of data. You can verify if this is the cause of sync loss by turning off or disconnecting the MIDI In cables (from the instrument into the Studio 5) and seeing if the sync problem goes away. If it does, you have a couple of choices:

- If you can stop the device from sending this data in the first place, do it. Unfortunately, most devices will not let you do this. Typically, the devices that send MIDI clocks have built in sequencers; some of them only send MIDI clocks when their sequencer is actually playing. Others send MIDI clock messages when they are in their "sequencer" mode, and active sensing (which is far less intrusive) when they are not. If you cannot stop the device from sending MIDI clocks, you can set its sequencer to the slowest possible tempo—this results in a slower MIDI clock transmission rate. You can see the tempo change on the Studio 5's MIDI In LED for that device; it will blink slowly at slow tempos, and very rapidly at fast tempos.
- You can slow down the Studio 5->Macintosh communication speed. Decreasing the communication speed will give the Macintosh more time to "see" the incoming MIDI data, and will help if the Macintosh is busy with a lot of output as well as input.
- If you're using only one serial cable between the Macintosh and the Studio 5, try using two. OMS applications, such as Vision and Studio Vision, will send only data generated from within the Studio 5 out the Studio 5's "B" port. This includes timecode, Studio 5 footswitch and foot controller data, as well as Audio In note events. All other data coming from MIDI devices connected to the Studio 5 will be sent out the Studio 5's "A" port. If you are running a non-OMS application, select **Compatibility Setup** from the **Studio 5** menu, then select either Standard Interface In or MIDI Time Piece In. Make sure that sync and *only* sync is sent out the Studio 5's "B" port (the **Auto** button will also do this).

- If you are running Vision or Studio Vision, select **Enable Input Devices** from the **Setups** menu. Only enable those input devices that you wish Vision to listen to. If you have 15 devices, but you only play one or two of them when you record, disable all other inputs.
- You can build Virtual Controllers which filter out the MIDI clock, active sensing or whatever your controller is sending. You can then use these Virtual Controllers instead of the actual devices. In Vision or Studio Vision, select **Enable Input Devices** from the **Setups** menu, then enable the Virtual Controllers and disable the actual devices they are based on. For non-OMS applications, select **Compatibility Setup** from the **Studio 5** menu, select either **Standard Interface In** or **MIDI Time Piece In** views, and then replace the unfiltered devices with their corresponding Virtual Controllers.

*Studio 5 will not sync to tape*

Make sure the power cord is firmly inserted into its connector, the power switch is on, and that the SMPTE/Power indicator light is lit.

Check all the cables between your computer and the Studio 5, and between the Studio 5 and your tape deck.

Verify that the SMPTE/Power indicator light blinks when it is receiving timecode from the tape deck. If not, you may have a bad cable or connection between the Studio 5 and your tape deck. Also, your SMPTE level may be recorded too low. If so, you may need to use a preamp or mixer to boost the SMPTE level before sending it to the Studio 5. See Chapter 6 for proper SMPTE record levels.

Choose **SMPTE Reader** from the **Studio 5** menu, then start the tape. If it displays timecode correctly, the problem is with your application setup, not the Studio 5.

*Sequencer gradually slows down rather than stopping when synced to a tape that has stopped*

JamSync mode is on. To turn off JamSync mode, choose **Stripe SMPTE** from the **Studio 5** menu, open the **Level** pop-up menu and choose **Off**. See "Stripe SMPTE" window description in Chapter 6 for more information.

*Audio In feature doesn't function*

Make sure the power cord is firmly inserted into its connector, the power switch is on, and that the SMPTE/Power indicator light is lit.

Check the cable between your audio input source and your Studio 5, and verify that **Audio In** is checked in the **Studio 5** menu.

Make sure your software knows how to interpret the Studio 5's Audio In feature.

## MIDI PROBLEMS

*More than one instrument sounds on a MIDI channel*

You may be using an OMS patch which contains a splitter routed to more than one device on the same MIDI channel.

You may be using an OMS patch that references a Virtual Instrument containing a splitter routed to more than one device on the same MIDI channel.

If you're playing into a sequencer, you should use an empty OMS patch—the MIDI Thru instrument is usually controlled by your sequencer (see Chapter 4: OMS Patches).

In compatibility mode, you may have "auto" enabled MIDI ins and outs, thus causing some devices (particularly those defined as multi-timbral) to sound on the same channel as other multi-timbral devices. There are only 16 channels available per port in a standard interface emulation mode.

*Incorrect system exclusive data sent to Virtual Instruments*

You can't send system exclusive data to a virtual instrument consisting of two or more MIDI channels from the same device, or the sysex data will be sent incorrectly (If you think about the situation, you wouldn't want to do this, anyway).

*Difficulty receiving large system exclusive data dumps*

Reduce the Studio 5->Macintosh communication speed if you're having difficulty receiving large System Exclusive data dumps. Reduce the speed in small increments until the data is received properly.

*MIDI data stream clogging*

If you're using Vision 1.3 or later, choose **Enable Input Devices** from the **Setups** menu and deselect any device which is not recording into the sequencer. Vision will ignore the data from these devices, and more processing power will be available for SMPTE sync or dense MIDI data handling chores.

Refer to "Studio 5 Loses Sync" in the previous section for more ways to thin the MIDI data stream.

## OMS Patch Problems

*A MIDI Source or Destination module contains a question mark*

Question marks indicate undefined modules. Click the downward facing triangle to the right of the question mark to open a pop-up menu of MIDI devices as defined in your current Studio Setup document. See Chapter 4 for more details.

*One or more MIDI Devices do not appear in the MIDI source pop-up menu*

The MIDI device is being used elsewhere within the same patch as a MIDI source.

*Patches don't work, MIDI source or destinations are greyed-out*

You probably have a Patch document that was created with a Studio Setup document other that the one that is now current. Either make the other Studio Setup document current, make another Patch document current, or re-select any greyed-out MIDI Source or Destination modules in the current patch and save it. See the "MIDI Source Module" section in Chapter 4.

## Miscellaneous Problems

*Foot Controller doesn't function*

Check that the foot controller is connected to the proper connector (FC1), and that **Foot Controller In** is checked in the **Studio 5** menu.

### *Macintosh crashes when running Studio 5/OMS Installer*

If you experience a crash when running the Studio 5/OMS Installer and are using the Virex INIT for virus protection, open the Control Panel and select Virex's panel. From the pop-up menu, select **File Diagnosing Options**. Deselect **Diagnose Files when Opened** and **Check for HyperCard Virus**. Run the Installer again, and the Macintosh should not crash. If problems persist, completely remove any Virus checking INITs from your System folder (Extensions folder for System 7), restart your Macintosh, and run the Installer again.

# Appendix E: Specifications

## GENERAL

**Processors**
68HC000 @ 16MHz
68B03 @ 8MHz

**Internal Memory**
32k x 8 battery backed SRAM

**Power Supply**
120VAC, 60Hz @ 280mA, or
240VAC, 50Hz @ 180mA

**External Dimensions (W x H x D)**
44.45 x 8.64 x 28.02 cm
(17.5" x 3.4" x 11.03")
2 Rack Spaces (2U spaces)

**Weight**
3.79 kg (8 lbs., 5.5 oz.)

**Operating Temperature**
0°C to 32°C (32°F to 89.6°F) ambient conditions

## CONNECTORS

**15 MIDI Ins**

**15 MIDI Outs**

**1 SMPTE In**
Type: Stereo Phone Jack
Input Impedance: 500kΩ

**1 SMPTE Out**
Type: Stereo Phone Jack
Output Impedance: <5Ω

**1 Audio In**
Type: Stereo Phone Jack
Input Impedance: 1kΩ

**2 Footswitch Ins**
Type: Mono Phone Jack
Input Impedance: 10kΩ

**1 Foot Controller In**
Type: Mono Phone Jack
Input Impedance: 100kΩ

**2 RS-422 Serial Computer Ports**

**2 RS-422 Peripheral "Thru" Ports**

## DISPLAY

**3-digit LED Display (0-127)**

## SWITCHES

**2 Patch Increment/Decrement switches**

**2 Peripheral "Thru" switches**

**1 Power on/off switch**

*Specifications and appearance subject to change without notice.

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